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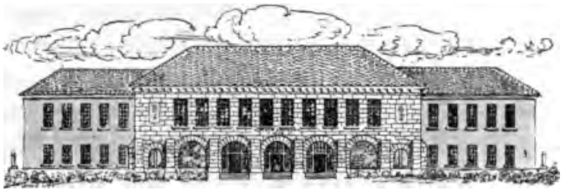

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PROCEEDINGS

OF THE

SEVENTH ANNIVERSARY

OF THE

UNIVERSITY CONVOCATION

OF THE

STATE OF NEW YORK,

Held August 2d, 3d, and 4th, 1870.

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THE UNIVERSITY CONVOCATION

OF THE

STATE OF NEW YORK.

I. SKETCH OF ITS ORIGIN, OBJECTS AND PLAN.

(Reprinted from former Reports.)

At a meeting of the Regents of the University, held on the 9th day of January, 1863, the reports of colleges and academies, and their mutual relations, being under consideration, the following resolution was unanimously adopted:

Resolved, That it is expedient to hold annually, under the direction of this Board, a meeting of officers of colleges and academies, and that a committee be appointed to draft a programme of business for the proposed meeting, to fix the time and place, and to make such other arrangements as they may deem necessary.

The committee of arrangements on the part of the Regents were Chancellor Pruyn, Governor Seymour, Mr. Benedict, Mr. Hawley, Mr. Clinton, Mr. Perkins, and Secretary Woolworth.

The meeting was held, according to appointment, on the 4th and 5th days of August, 1863. Chancellor Pruyn briefly stated the objects entertained by the Regents, which were mainly "to consider the mutual relations of colleges and academies, and to promote, as largely as possible, the cause of liberal education in our State. While it is a part of the duty of the Regents of the University to visit the fourteen colleges and more than two hundred academies subject to their supervision, it is obvious that this cannot be done as frequently as desirable, and that some such method as is now proposed, whereby teachers may compare views with each other and with the Regents, and discuss methods of instruction and general modes of procedure, is alike practicable and necessary.

"A law enacted more than three-fourths of a century ago was cited, by which the University was organized and clothed with powers similar to those held by the Universities of Cambridge and Oxford in England. The University of the State of New York, though generally regarded as a legal fiction, is, in truth, a grand reality. The numerous institutions of which it is composed are not, indeed, as in England, crowded into a single city, but are scattered, for popular convenience, over the entire State. It is hoped that the present meeting will more fully develop this fact, in accordance with which the officers of colleges and academies now convened are cordially welcomed as members of a great State University. It is also confidently expected that the deliberations now inaugurated will result in the more intimate alliance and coöperation of the various institutions holding chartered rights under the Regents of the University."

The Chancellor and Secretary of the Regents were, on motion, duly elected presiding and recording officers of the meeting. A committee, subsequently made permanent for the year and designated as the executive committee, was appointed by the Chancellor to prepare and report an order of proceedings. Among other recommendations of the committee, the following were submitted and unanimously adopted:

The Regents of the University of this State have called the present meeting of the officers of the colleges and academies subject to their visitation, for the purpose of mutual consultation respecting the cause of education, especially in the higher departments. It becomes a question of interest whether this convention shall assume a permanent form and meet at stated intervals, either annually, biennially or triennially. In the opinion of the committee, it seems eminently desirable that the Regents and the instructors in the colleges and academies should thus meet, with reference to the attainment of the following objects:

1st. To secure a better acquaintance among those engaged in these departments of instruction with each other and with the Regents.

2d. To secure an interchange of opinions on the best methods of instruction in both colleges and academies; and, as a consequence,

3d. To advance the standard of education throughout the State.

4th. To adopt such common rules as may seem best fitted to promote the harmonious workings of the State system of education.

5th. To consult and coöperate with the Regents in devising and executing such plans of education as the advanced state of the population may demand.

6th. To exert a direct influence upon the people and the Legislature of the State, personally and through the press, so as to secure such an appreciation of a thorough system of education, together with such pecuniary aid and legislative enactments as will place the institutions here represented in a position worthy of the population and resources of the State.

And for the attainment of these objects the committee recommend the adoption of the following resolutions:

Resolved, That this meeting of officers of colleges and academies be hereafter known and designated as "The University Convocation of the State of New York."

Resolved, That the members of this Convocation shall embrace,

1. The members of the Board of Regents.
2. All instructors in colleges, normal schools, academies and higher departments of public schools that are subject to the visitation of the Regents, and (by amendment of 1868) the trustees of all such institutions.
3. The president, first vice-president and the recording and corresponding secretaries of the New York State Teachers' Association.

Resolved, That the Chancellor and Secretary of the Board of Regents shall act severally as the presiding officer and permanent secretary of the Convocation.

Resolved, That the meeting of this Convocation shall be held annually in the city of Albany, on the first Tuesday of August, at ten o'clock A. M., unless otherwise appointed by the Board of Regents.

Resolved, That at each annual Convocation the Chancellor shall announce the appointment, by the Regents, of an executive committee of seven members, who shall meet during the recess of the Con vocation at such time and place as the Regents may direct, with authority to transact business connected with its general object.

At the fifth anniversary, held August 4, 5 and 6, 1868, the following resolutions were unanimously adopted:

Resolved, That there be appointed by the Chancellor at each annual meeting, a committee of necrology, to consist of three persons.

Resolved, That it shall be the duty of each member of the Convocation to notify the chairman of the committee of necrology of the decease of members occurring in their immediate neighborhood or circle of acquaintance, as an assistance to the preparation of their report

Resolved, That the secretary publish, with the report of each year's proceedings, the original resolutions of 1863, as they are, or may be from time to time amended, together with the two foregoing, as a means of better informing the members of the Convocation in regard to its nature, and the purposes of its organization.

II. MINUTES OF THE SEVENTH ANNIVERSARY, AUGUST 2, 3 AND 4, 1870.

The sessions of the seventh anniversary of the University Convocation of the State of New York were held, pursuant to adjournment, at the Assembly Chamber in the Capitol, in the city of Albany, commencing on Tuesday, August 2, 1870, at 10:30 A. M., and closing on Thursday, August 4, at 1 o'clock P. M.

The Chancellor of the University (Mr. Pruyn), as President *ex officio*, called the Convocation to order and made the following address:

The programme for our proceedings, prepared under the direction of the Executive Committee, shows that subjects of much interest will come before us. I am sure that they will be treated in the spirit of candor which has always characterized the discussions of the Convocation, and conduce to the benefit of the cause to promote which we have now met.

The old world is convulsed by the struggles of those who seek territorial aggrandisement by force. Teachers and students alike find their pursuits suspended, and the common good, which requires the education of the masses, is made to yield to the ambitious views of those who, clothed with power, seek to use it for selfish purposes. We, whose acquisition of territory has been peaceful, look upon the struggle with the sure expectation that it will be overruled by a higher power to our ultimate good; and that the friends of learning and science will find that they are best promoted and advanced in a country in which the welfare of the people is the great object of government, and where bad and selfish men, if they acquire power, hold it but for a brief time. In the country to which we owe our language and so much of our literature, and to which so many of us look as the home of our ancestry, very full discussions have lately taken place on the subject of elementary education and the management of the schools for the people, which, although in many respects not applicable to us and to our institutions, are yet, in some respects, of interest, theoretically as well as practically. I trust that some person qualified for the duty will give us, at an early day, a history of the matter and an account of the results reached.

While our association does not profess to deal with this subject, at least not in detail, it is one of great interest, and its influence reaches every institution of learning in the land.

I welcome you, not only for myself, but on the part of the Board of Regents, to this anniversary meeting, and hope that our efforts may promote, in some measure at least, the interest of that cause we all so warmly cherish, the education of the people.

It gives me satisfaction to say that the condition of the Colleges and Academies of the State is highly prosperous, and that they are constantly advancing in the efficiency of organization and thoroughness of teaching, and, consequently, in usefulness and power.

The Convocation then united in the use of the Lord's Prayer, Rev. Dr. Goodwin, one of the Regents, leading the devotional exercise.

The secretary (Dr. Woolworth) announced the absence, by illness, of Rev. Prof. B. N. Martin, D. D., L. H. D., of New York city, Chairman of the Executive Committee, and stated that the committee, at their meeting last evening, appointed Rev. Prof. William D. Wilson, D. D., LL.D., of the Cornell University, Chairman. On motion of Regent Wetmore, this appointment was confirmed by the Convocation.

The attending members of the Executive Committee, as thus reorganized, were Rev. William D. Wilson, D. D., LL.D., of Cornell University; Professor Le Roy C. Cooley, Ph. D., of the State Normal School; Principal John H. Willard, of Troy Female Seminary; and Principal Emerson J. Hamilton, of Oswego High School.

Dr. Wilson then announced the following order of exercises for the day, which was approved by the Convocation:

ORDER OF EXERCISES.

Sessions (except the first) 9 A. M. to 1 P. M.; 3½ to 5½ P. M.; 8 P. M.

Tuesday, August 2.

10:30 A. M.—Opening of the Convocation, and preliminary report of the Executive Committee.

11:00 A. M.—Lectures and Text Books—President Joseph Alden, D. D., LL.D., State Normal School.

12:00 M.—The Logic of Language, and its Application in Teaching Rhetoric and Metaphysics—Professor William D. Wilson, D. D., LL.D., Cornell University.

12:45 P. M.—Miscellaneous business.

1:00 P. M.—Recess.

3:30 P. M.—A New Method of Solving Cubics and Trinomial Equations of all Degrees—Professor Evan W. Evans, A. M., Cornell University.

4:30 P. M.—Academic Education in England—Principal Alonzo Flack, A. M., Claverack Academy and Hudson River Institute.

5:00 P. M.—Miscellaneous business.

5:30 P. M.—Recess.

8:00 P. M.—A Course of Instruction based on Man's Necessities and Purposes—Professor David H. Cruttenden, A. M., New York city.

8:30 P. M.—University Necrology:

Vice-Chancellor Gulian C. Verplanck, LL.D., New York city ....
Regent Gideon Hawley, LL.D., Albany ....
Regent Samuel Luckey, D. D., Rochester ....
Regent Robert Campbell, Bath..................
Ex-Regent Victor M. Rice......................
Mrs. Emma Willard, Troy Female Seminary ......
} *Deceased.*

Secretary SAMUEL B. WOOLWORTH, LL.D.,
Chairman of Committee.

In accordance with the programme, President Alden, of the State Normal School, read a paper entitled "Lectures and Text Books."

Dr. Alden's paper gave rise to an animated discussion, in which Secretary Woolworth, Professors Charles Davies, of Fishkill-on-the-Hudson; James McNaughton, of Albany Medical College; Cornelius M. O'Leary, of Manhattan College; and Principals Joseph E. King, of Fort Edward Collegiate Institute; Noah T. Clarke, of Canandaigua Academy; Emerson J. Hamilton, of Oswego High School; Alonzo Flack, of Claverack Academy and Hudson River Institute; Francis G. Snook, of Monticello Academy; Harvey R. Schermerhorn, of Hudson Academy; and Elisha Curtiss, of Sodus Academy, participated, generally approving the views of the paper, and the proper use of text books in preference to lectures, as the chief mode of giving instruction.

Professor William D. Wilson, D. D., LL.D., of the Cornell University, read a paper entitled "The Logic of Language, and its Application in teaching Rhetoric and Metaphysics."

After the reading of Professor Wilson's paper, which was briefly discussed, the Chairman of the Executive Committee reported the following resolution, which was adopted:

Resolved, That a committee of five be appointed to report to this Convocation on the methods of conducting Academic and College Examinations.

The Chair appointed as such committee, Professor Wilson, of Cornell University; President Barnard, of Columbia College; Professor Dealy, of the College of St. Francis Xavier; and Principals Morehouse, of Albion, and Ingalsbe, of Argyle.

Under the head of miscellaneous business, Dr. Franklin B. Hough, a trustee of Lowville Academy, submitted the following brief statement in regard to the formation of cabinets in academies, by exchange

Assuming without argument that geological and mineralogical cabinets are among the most important auxiliaries to education, and that a knowledge of our resources in these departments of science in our State is worthy of eminent encouragement, I wish briefly to submit a plan which I believe would, if adopted, tend greatly to the advancement of knowledge and to the cultivation of observation and inquiry, so important as an element of education, and so conducive to success in after life.

There are some two hundred academies in operation throughout the State, representing every section from the Atlantic to the great lakes. There is no important mine, or mineral locality, or geological formation with its characteristic fossils, that is not within convenient reach of some one of these academies. It is presumed that in the greater number of these institutions the natural sciences are professedly taught, and if this instruction is given with that intelligence that the subject demands, it is more or less illustrated by reference to the examples which are presented by nature in the vicinity, and by specimens showing the form, structure and peculiarities incident to the subject.

When these studies are faithfully conducted, it is seldom that the student fails to take an interest in observing the application of his precepts according to his opportunities; and it requires but a moderate amount of enthusiasm in the teacher to send his pupils on a tour of geological inquiry, or to lead them to a locality where some important fact may be observed.

By previous correspondence and arrangement at a central point, there might easily be assigned to each academy willing to engage in the enterprise some half dozen or more objects for a particular collection, in numbers sufficient for a general exchange. It might be an ore, a well characterized mineral, or fossil remains, perhaps abundant in that locality but of limited range, and altogether unknown in other places.

These being carefully collected in numbers of two or three hundred of a kind, and sent to the central place and the person in charge of the enterprise, might be carefully labeled, distributed so that each collection should contain representatives from the whole, and then returned to the institutions participating in the exchange. These cabinets would be much more valuable if accompanied by a descriptive catalogue, in which the economical value or scientific characters of each specimen, and any peculiarities or other information concerning it, might be explained.

The Legislature could scarcely promote the science of geology in its various applications so effectually as by defraying the expenses of transportation, assortment and labeling which this exchange would involve, and every academic institution in the State might easily, and without much delay or expense, possess a cabinet abundantly rich in variety, entirely authentic in its labels and of incalculable value to its students, embracing as it would the entire range of mineral wealth and geological interest in the State of New York. Its agency could not fail of being felt, by an increased attention to our material resources and to the cultivation of that habit of inquiry and observation which forms one of the principal objects of education.

Professor Hall, Curator of the State Museum of Natural History, spoke warmly in approval of Dr. Hough's proposition, and on motion of Principal Snook, the Chair was authorized to appoint a committee of five to report a definite plan for carrying out the suggestions made by Dr. Hough.

The Chair appointed as such committee, Dr. Hough, Professor Hall, and Principals Snook, Steele and Hamilton.

The Convocation then took a recess until three and one-half o'clock, P. M.

AFTERNOON SESSION — THREE AND ONE-HALF O'CLOCK.

Professor Evan W. Evans, of Cornell University, read a paper entitled "A New Method of Solving Cubics and Trinomial Equations of all Degrees."

The subject of Professor Evans' paper was briefly discussed by Professors Wilson and Davies.

The discussion of the subject of President Alden's paper was resumed, and Mr. Capen, of Boston; Professor Partridge, of New York; Professor Davies, and Principals Morehouse and Snook, participated in the discussion.

The Chairman of the Executive Committee announced that Professor David H. Cruttenden, to whom the first hour of the evening session had been assigned, prefers to fulfil his appointment at a subsequent session, and that Dr. Charles J. Hinkel, of Vassar College, will read a paper on "Liberal Education," at eight o'clock, P. M.

Principal Flack, of Claverack Academy and Hudson River Institute, read a paper entitled "Academic Education in England."

The subject of Principal Flack's paper was discussed by Secretary Woolworth, Rev. Regent Goodwin and Principal Steele.

The Convocation then took a recess until eight o'clock, P. M.

EVENING SESSION — EIGHT O'CLOCK.

Professor Charles J. Hinkel, Ph. D., of Vassar College, read a paper entitled "A Liberal Education;" Regent Wetmore in the Chair.

Secretary Woolworth, as Chairman of the standing committee on University Necrology, made a report, from which it appeared that the following members of the Convocation have died during the past year, viz.:

Vice-Chancellor Gulian C. Verplanck, LL.D., New York city.

Regent Gideon Hawley, LL.D., Albany.

Regent Samuel Luckey, D. D., Rochester.

Regent Robert Campbell, Bath.

Ex-Regent Victor M. Rice.

Mrs. Emma Willard, Troy Female Seminary.

Secretary Woolworth further stated that notices of some of these persons would be presented.

Rev. Dr. Goodwin then read a memorial of the late Rev. Dr. Luckey, and Chancellor Pruyn spoke of his services as a member of the Board of Regents, and of the eminent purity of his life.

A memorial of the late Mrs. Emma Willard, prepared by Mrs. John H. Willard, was read by Mr. John H. Peck, of Troy. Prof. Davies spoke of the character and services of Mrs. W., and Principal Flack added facts of interest, showing some of the results of her labors in the cause of education.

Remarks were made by Secretary Woolworth on the services of the late Superintendent Victor M. Rice; by Chancellor Pruyn and Regent Wetmore relative to the late Regent and Ex-Governor Robt. Campbell and Regent Gideon Hawley; and by Regent Benedict on the character and services of the late Vice-Chancellor Gulian C. Verplanck. Mr. Benedict stated that Mr. William C. Bryant had delivered a eulogy on Mr. Verplanck, before the New York Historical Society, and moved that, with Mr. Bryant's consent, such eulogy be published as a part of the Convocation proceedings.

Regent Hale seconded the motion, with remarks, and it was unanimously adopted.

Dr. Wilson added interesting facts relative to the early life of Regent Campbell; and Principal Jones, of Geneseo, spoke of his marked gentleness, love of learning, and great generosity, less conspicuous yet marked traits of his character.

After further notice of Mr. Hawley, by Regent Benedict, the Convocation adjourned to Wednesday morning at nine o'clock.

SECOND DAY.

MORNING SESSION—NINE O'CLOCK.

The Convocation was opened with the usual devotional exercises, conducted by Rev. Dr. King, of Fort Edward Collegiate Institute.

The following order of exercises for the day was submitted by the Executive Committee and approved by the Convocation:

Wednesday, August 3.

9:15 A. M.—Decimal Coinage and the Metric System of Weights and Measures—Professor Charles Davies, LL.D., Fishkill Landing, Chairman of Committee.

10:45 A. M.—Physiology in relation to Psychology—Professor Cornelius M. O'Leary, Ph. D., M. D., Manhattan College.

11:30 A. M.—The Study of Physical Geography—Principal Grenville M. Ingalsbe, A. B., Argyle Academy.

12:15 P. M.—The Military Roll of Honor—Professor Anson J. Upson, Hamilton College, Chairman of Committee.

12:45 P. M.—Miscellaneous business.

1:00 P. M.—Recess.

3:30 P. M.—A Course of Instruction based on Man's Necessities and Purposes—Professor David H. Cruttenden, A. M., New York city.

4:15 P. M.—The Benefits of a Classical as compared with a Scientific Course of Study—Principal George H. Barton, A. B., Rome Academy.

5:00 P. M.—Voluntary Endowments of Colleges and Academies:
  Report as to Desirable Legislation—Chancellor John V. L. Pruyn, Albany, Chairman of Committee.
  Report as to Circular Address—Principal Albert Wells, A. M., Peekskill Academy, Chairman of Committee.

5:50 P. M.—Miscellaneous bnsiness.

5:45 P. M.—Recess.

8:00 P. M.—John Milton as a Teacher—Principal Homer B. Sprague, A. M., Adelphi Academy of Brooklyn.

Professor Davies, as chairman of the committee to which the subject of "Decimal Coinage and the Metric System of Weights and Measures" had been referred at former Convocations, made an extended report, and submitted the following resolutions, which were laid over for consideration:

Resolved, That the subject of changing our entire system of weights and measures, and substituting therefor the Metric system of France, is too grave and important to be acted upon without a very full and careful examination of all its bearings and all its consequences.

Resolved, That the Commtitee on Coinage, Weights and Measures, be requested to publish their report to the Convocation, with such additions as they may deem necessary, in connection with the report of John Quincy Adams on Weights and Measures, made to the House of Representatives in the year 1821, and the Lecture of Sir John Herschel, on the Yard, the Pendulum and the Meter, to the end that the whole subject may be more fully discussed, considered and understood.

Resolved, That this Convocation do recommend to all teachers and to all others interested in the establishment of uniform standards throughout the world, to give special attention and study to this subject now engrossing public attention, that it may finally be disposed of wisely and for the common interest of all nations.

Resolved, That this Convocation do hereby express the conviction, that such changes should be made in the value of the franc, the dollar and the English pound sterling, that five francs be exactly equal in value to one dollar, and five dollars exactly equal in value to one pound sterling.

Resolved, That the Committee on Coins, Weights and Measures, be and they are hereby authorized to take such steps, by correspondence or otherwise, as will, in their judgment, be most likely to give effect to the above suggestion.

Resolved, That as a means of reaching uniformity of currency, it be and it is hereby earnestly recommended to all authors and publishers of elementary arithmetics, to exclude from future editions every currency not recognized and established by law.

Resolved, That the Committee on Coins, Weights and Measures, be and they are hereby authorized to ask the attention of the government, and of all associations for the advancement of science and knowledge, to the expediency of changing the value of the ounce Troy, and thus substituting a single weight for the three now in use.

Regent Hale, as a member of the committee making the report, stated that its authorship is solely due to Professor Davies. He also submitted some considerations drawn from the legal stand-point, to illustrate the great importance of this subject.

Professor Cornelius M. O'Leary, M. D., Ph. D., of Manhattan College, read a paper on "Physiology in Relation to Psychology."

The subject of Professor O'Leary's paper was discussed by Professors David H. Cruttenden and Benjamin N. Martin, who warmly indorsed the views presented in opposition to the materialistic philosophy of the day.

Principal Grenville M. Ingalsbe, of Argyle Academy, read a paper entitled "The Study of Physical Geography," which led to an animated discussion, in which Principals Arthur, Clarke and Snook, Professor Cruttenden and Regent Hale participated.

Assistant Secretary Pratt, in behalf of the select committee on the military roll of honor, made a verbal report in regard to the progress made in collecting additional statistics during the past year, and submitted the papers embodying the results attained.

Regent Wetmore made an extended statement on this subject, and offered the following resolutions:

Resolved, That the papers written or printed, submitted on the part of the select committee on the "Military Roll of Honor," be accepted as a report in part, and that the committee be continued.

Resolved, That it is the design of this Convocation to have a complete record made up, and deposited in some convenient place for reference, of a military roll of honor, comprising, as far as practicable, the names of all the persons connected with the colleges and academies in this State, who took part in the public service of the United States, between the 15th of April, 1861, and the 10th of April, 1865; and that the said roll shall also contain such further statements of the services and the incidents connected therewith, as the committee may be enabled to obtain.

On motion of Dr. Martin, the former of these resolutions was amended by adding the name of Regent Wetmore, as Chairman of the committee. The resolutions as amended were unanimously adopted.

The committee as thus constituted, consists of Regent Prosper M. Wetmore, New York city; Professor Anson J. Upson, Hamilton College; Professor Benjamin N. Martin, D. D., L. H. D., University of the city of New York; Assistant Secretary Daniel J. Pratt, Albany; Principal Noah T. Clarke, Ph. D., Canandaigua Academy; Principal Albert S. Graves, Oneida Conference Seminary; Principal Joseph E. King, D. D., Fort Edward Collegiate Institute.

The Convocation then took a recess until three and one-half o'clock.

AFTERNOON SESSION — THREE AND ONE-HALF O'CLOCK.

Professor David H. Cruttenden, of New York city, read (if one nearly blind may be said to read), a paper entitled "A Course of Studies based on Human Necessities and Purposes."

Principal George H. Barton, of Rome Academy, read a paper on "The Benefits of a Classical, as compared with a Scientific Course of Study."

Chancellor Pruyn, as Chairman of the committee appointed at the last Convocation to urge the passage of "An act to encourage and protect endowments for public, charitable, literary and other purposes," submitted the draft of a bill which was favorably reported by the Committee of Ways and Means of the Assembly during the last session, but which was not urged to a final passage, it being deemed advisable to lay it more generally before the friends of education throughout the State, to secure the benefit of further suggestions in regard to its provisions, and to enlist its friends more thoroughly in its support. The bill, in its present form, is materially different from the one introduced in the Assembly in 1867 (a copy of which appears in the Convocation proceedings for that year), having been modified in regard to some of its substantive provisions to meet the views of the Committee of Ways and Means. [A copy of this amended bill is included, with other documents bearing upon the subject of endowments, in the Convocation proceedings for 1869.]

Chancellor Pruyn dwelt at some length upon the importance of the legislation contemplated in this bill, and was followed by Secretary Woolworth, and Trustee William H. Bogart, of Wells College, who also urged the claims of higher education to generous pecuniary support.

On motion of Principal Wells, of Peekskill Academy, the same committee (Chancellor Pruyn, Professor Upson of Hamilton College, and President Cochran of Brooklyn Collegiate and Polytechnic Institute), was continued for another year.

On motion of Principal Jones, of Geneseo Academy, the following resolution was unanimously adopted:

Resolved, That, in the judgment of this Convocation, the passage of a law rendering secure endowments made to colleges and academies is eminently desirable, and will greatly conduce to the cause of education in this State.

The consideration of the resolutions submitted by Prof. Davies during the morning session, relative to decimal coinage, etc., was resumed; and, after discussion by Dr. Wilson, Regent Benedict and Principal Snook, on motion of Principal Flack, the said resolutions were adopted.

Principal King, of Fort Edward Collegiate Institute, offered the following resolution, which was adopted:

Resolved, That the Chancellor be requested to appoint a member of this Convocation to correspond with the principals of academies and presidents of colleges in this State and other States, and obtain their plans of governing pupils, and to report to the Convocation at its next meeting the result of his correspondence and investigation.

The mover of the resolution having declined to serve as such committee, Principal Flack, of Claverack, was appointed by the chair.

Dr. Franklin B. Hough, from the committee appointed to report a plan for providing academies with geological cabinets by a system of exchanges, made the following report, which was accepted:

The committee of the Convocation appointed to take into consideration a plan for a mutual exchange of geological specimens, minerals and fossils, have considered the subject referred to them, and agree that measures should be at once taken to ascertain how many academies would be willing to engage in the enterprise, and the extent to which they would be able to aid in making collections.

The value of collections representing the leading facts concerning the geology and mineralogy of the State, and placed in every part of it, needs no argument for proof. Yet this advantage will, in a great degree, depend upon the interest taken in the measure at the institutions receiving them. The committee would recommend the following conditions:

1. That the collections shall be considered as the property of the institution receiving them, and not of any individual who may be in charge.

2. That, as a condition precedent, the trustees or other responsible persons shall engage to provide suitable glazed cases for the reception of the cabinets they may receive, and to place them under the care of some person, with regulations for their proper use and preservation.

The committee, believing that well-selected geological and mineral cabinets, with authentic labels, would be found the most efficient means of education in these important sciences, and as such worthy of the enlightened notice of our State government, would therefore recommend that this Convocation authorize a memorial to the Legislature at its next session, asking that an appropriation be made to pay the moderate expenses incident to freight, labeling and distribution of such collections as may be voluntarily made by the various institutions participating in this measure.

They would also recommend that the Regents of the University be invited to consider the proposed plan of a mutual exchange, and that, if they approve, they be requested to issue the circulars of this committee with their official sanction.

Principal Clarke, of Canandaigua, offered the following resolutions, which were unanimously adopted:

Resolved, That the committee appointed to consider a plan for the formation of geological and mineral cabinets in academies through a central agency, be authorized, on behalf of this Convocation, to address a memorial to the Legislature of this State at its next session, asking for an appropriation sufficient to defray the expenses of freight, labeling and distribution, and for a descriptive catalogue of the collections that may be voluntarily made, for the purpose of mutual exchange, by the various institutions under the care of the Regents of the University.

Resolved, That the Regents of the University be invited to consider the proposed plan of mutual exchanges, and that, if they approve of the same, they be requested to issue the circulars of this committee, and give it their official sanction.

The Chancellor invited the members of the Convocation to meet in a social gathering, at the State Library, at the close of the evening session.

The Convocation then took a recess until eight o'clock P. M.

EVENING SESSION—EIGHT O'CLOCK.

Col. Homer B. Sprague, late Professor of Rhetoric in Cornell University, and Principal elect of the Adelphi Academy of Brooklyn, delivered an address on "John Milton as a Teacher." (Regent Benedict in the Chair.)

Chancellor Pruyn announced that certain honorary degrees had this day been decreed by the Regents of the University, which would be conferred in the presence of the Convocation. The Secretary read the proceedings of the Board directing that the honorary degree of Doctor in Literature be conferred on William Cullen Bryant and Horatio Seymour. The degree was then duly conferred by the Chancellor.

The Secretary further read from the minutes of the Board that the honorary degree of Doctor in Philosophy had been directed to be conferred on Emerson John Hamilton, A. M., of the Oswego High School, and Joel Dorman Steele, A. M., of the Elmira Free Academy, which degree was conferred on those gentlemen severally, by the Chancellor.

The Convocation then adjourned to meet to-morrow morning at nine o'clock, and the members repaired to the State Library, in accordance with the invitation of the Chancellor.

THIRD DAY.

MORNING SESSION—NINE O'CLOCK.

The usual opening devotional exercises were conducted by Rev. Dr. Fairbairn, Warden of St. Stephen's College.

The Chairman of the Executive Committee announced the order of exercises for this closing session, which was approved by the Convocation:

Thursday, August 4.

9:00 A. M.—Devotional Exercises, and Final Report of the Executive Committee.

9:15 A. M.—Report on Methods of Conducting Academic and College Examinations—Professor William D. Wilson, D. D., LL.D., Cornell University.

10:00 A. M.—The Religious Culture of College and Seminary Students—Principal John Easter, A. M., East Genesee Conference Seminary.

10:45 A. M.—Body and Mind; their Conservative Influence on each other—Mrs. Professor Clemence S. Lozier, M. D., New York Medical College for Women.

11:15 A. M.—Report on Honorary Degrees—President Andrew D. White, LL.D., Cornell University, Chairman of Committee.

11:45 A. M.—Annals of Public Education in the State of New York (continued)—Assistant Secretary Daniel J. Pratt, A. M., Albany.

12:00 M.—Miscellaneous business.

1:00 P. M.—Final adjournment.

It was also announced that arrangements had been made with the following lines to return without charge, on or before August 10th, instant, members of the Convocation who have paid full fare one way over the same routes, on presenting the certificate of the Assistant Secretary, issued for the purpose, on application to him:

Hudson River Day Line of Steamers ("C. Vibbard" and "Daniel Drew"); New York and Troy Steamboat Company (night steamers "Connecticut" and "Vanderbilt"); Lake Champlain Transportation Company (steamers "Adirondack," "Canada" and "United States"); Albany and Susquehanna railroad; Rensselaer and Saratoga railroad (Albany to Whitehall, Rutland, Vt., etc.); New York and Oswego Midland railroad; Utica, Chenango and Susquehanna Valley railroad; Utica and Black River railroad; Oswego and Syracuse, and Syracuse and Binghamton railroads.

The Chairman of the Executive Committee announced the receipt of letters from President Barnard and Professor Drisler, both of Columbia College, expressing deep regret that they have unexpectedly been prevented from being present. He further stated that papers have been received from Professor Norman F. Wright, of the Cortland Normal School, and Mrs. Caroline P. Achilles, of the Phipps Union Seminary at Albion, who are unable to be present, and recommended that in consequence of the pressure of other business these papers be referred to the committee with power, which was agreed to; also, that the programme for the present session includes all the papers remaining to be disposed of, which have been actually furnished.

Dr. Wilson, as chairman of the committee appointed on Tuesday, to consider "Methods of Conducting Academic and College Examinations," made a report on that subject. The report reviewed the methods in common use of conducting examinations, and presented a new one for which some points of superiority are claimed. It consists in preparing a series of examination papers, no two alike, and in such form that every question that can fairly be asked shall be proposed. These are to be presented to the pupils some days or weeks before the examination, and on the day of examination each student is to select by lot the special set of questions he is to answer.

The report was discussed at considerable length by Dr. Clarke, Professors Davies and Cooley, Principals Flack, of Claverack; Mattice, of Hudson Academy; Beattie, of Troy High School; Steele, of Elmira; and Morehouse, of Albion.

A paper on "The Religious Culture of College and Seminary Students" was read by Rev. John Easter, Principal of the East Genesee Conference Seminary.

The subject was discussed by Dr. Martin, Regent Goodwin, and Professor Daniel S. Martin, of Rutgers Female College.

A paper entitled "Body and Mind; their conservative influence on each other," by Mrs. Professor Lozier, of the New York Medical College for Women, was read, on her behalf, by Dr. Steele, of Elmira.

This paper, which seemed to harmonize with the preceding one by Principal Easter, was discussed by Professor Cruttenden and others.

In the absence of the chairman of the committee appointed to present a report on "Honorary Degrees," the committee was continued for another year.

Assistant Secretary Pratt submitted the draft of another chapter of Annals of Public Education in the State of New York, comprising the period from the first legislative act for founding a college, in 1746, to the end of the colonial period of the State, and made some explanatory statements in regard to the general subject as continued from year to year.

On motion of Dr. King, the Assistant Secretary was requested to perfect the paper for the period named, and that it be included in the published proceedings of the Convocation, which was unanimously agreed to.

Principal Flack offered the following resolution, which was adopted after discussion by Secretaries Woolworth and Pratt, and Drs. Clarke and Davies:

Resolved, That Dr. Steele be a committee to correspond with other teachers during the ensuing year, upon the best methods of conducting examinations, and report the results to this Convocation next year.

The Chancellor announced the Executive Committee of the Convocation for the ensuing year as follows:

Professor William D. Wilson, D. D., LL.D., Cornell University.
President James Rankine, D. D., Hobart College.
Professor Patrick F. Dealy, S. J., College of St. Francis Xavier.
Principal Noah T. Clarke, Ph. D., Canandaigua Academy.
Principal John Jones, Geneseo Academy.
Principal David Beattie, Troy High School.
Principal Oliver Morehouse, Albion Academy.

The Committee on University Necrology was reappointed, viz.:

Secretary Samuel B. Woolworth, LL.D., Albany.
Professor Edward North, L. H. D., Hamilton College.
Professor Daniel S. Martin, Rutgers Female College.

On motion of Dr. Wilson, the following resolution was adopted:

Resolved, That the thanks of this Convocation are due, and are hereby tendered to Chancellor Pruyn for his kind attention and liberal hospitalities to its members.

Also, on motion of Professor Jones, of Geneseo,

Resolved, That the thanks of this Convocation are due and are hereby tendered to the officers of the various railroad and steamboat companies having charge of lines of travel, who have extended to us the courtesy of reduced fare.

At the request of Chancellor Pruyn, Regent Benedict took the chair and made appropriate concluding remarks, especially congratulating the Convocation upon the marked success and usefulness of this organization during the seven years of its existence.

The benediction was then pronounced by Rev. Dr. Goodwin, and the Convocation was declared adjourned, to meet on the first Tuesday of August, 1871.

REGISTERED MEMBERS OF THE CONVOCATION.

Board of Regents.

John V. L. Pruyn, LL.D., Chancellor; Abram B. Weaver, Superintendent of Public Instruction; Prosper M. Wetmore, New York city; Robert G. Rankin, Newburgh; Erastus C. Benedict, LL.D., New York city; Lorenzo Burrows, Albion; Robert S. Hale, LL.D., Elizabethtown; Elias W. Leavenworth, Syracuse; George R. Perkins, LL.D., Utica; William H. Goodwin, D. D., LL.D., Clifton Springs; Samuel B. Woolworth, LL.D., Secretary; Daniel J. Pratt, Assistant Secretary.

Colleges, etc.

Columbia College—Professor Charles Davies, LL.D.

Union College—Trustee Ira Harris, LL.D.

Hamilton College—President Samuel G. Brown, LL.D.

Hobart College—President James Rankine, D. D.

University of the City of New York—Benjamin N. Martin, D. D., L. H. D.

St. John's College—Professor Louis Jouin, S. J.

University of Rochester—Chancellor Ira Harris, LL.D.

University of Albany, Law Department—Professor Ira Harris, LL.D.

Alfred University—President Jonathan Allen, Professors Ida F. Kenyon and Anderson R. Wightman, I. S. Wightman.

St. Stephen's College—Warden Robert B. Fairbairn, D. D.

College of St. Francis Xavier—Professor Patrick F. Dealy, S. J.

Vassar College—Professor Charles J. Hinkel, Ph. D.

Manhattan College—Professor Cornelius M. O'Leary, M. D., Ph. D.

Cornell University—Professors William D. Wilson, D. D., LL.D.; Evan W. Evans; William C. Russel; Goldwin Smith, L. H. D.

College of the City of New York—Tutor Joseph H. Palmer.

Rutgers Female College—Professor Daniel S. Martin.

Wells College—Trustee William H. Bogart.

Rensselaer Polytechnic Institute—Professor James Hall, LL.D.

Albany Medical College—Professors Jas. McNaughton and Albert Van Derveer.

New York Medical College for Women—Professor Clemence S. Lozier; Trustees Tryphenia Bayard and D. E. Sackett.

New York State Normal School—President Joseph Alden, D. D., LL.D.; Professor Le Roy C. Cooley, Ph. D.

Brockport Normal and Training School—President Charles D. McLean.

Potsdam Normal and Training School—Professor Henry L. Harter.

Maplewood Institute, Pittsfield, Mass.—Principal C. V. Spear.

Ontario (Canada) Council of Public Instruction—Wm. Ormiston, D. D.

Department of Public Instruction (N. Y. State)—Superintendent Abram B. Weaver; Deputy Superintendent Edward Danforth; James C. Brown; George B. Weaver.

New York State Library—Librarians Henry A. Homes and Stephen B. Griswold.

New York State Museum of Natural History—Curator James Hall, LL.D.

Watkinson Library, Hartford, Conn.—Librarian J. Hammond Trumbull.

ACADEMIES, ETC.

Academy at Little Falls—Principal E. E. Sheldon.

Adelphi Academy of Brooklyn—Principal Homer B. Sprague.

Albany Classical Institute—Ex-Principal David B. Luther.

Albany Female Academy—Principal Louisa Ostrom.

Albany Public School, No. 14—Principal James L. Bothwell; No. 4, Principal Elkanah A. Briggs.

Albion Academy—Principal Oliver Morehouse.

Amenia Seminary—Principal Samuel T. Frost.

Argyle Academy—Principal Grenville M. Ingalsbe.

Canandaigua Academy—Principal Noah T. Clarke, Ph. D.; Professor Charles S. Halsey.

Cary Collegiate Seminary—Principal James R. Coe.

Claverack Academy and H. R. Institute—Principal Alonzo Flack.

Cortland Normal School—M. E. Chapin, member.

Darien Seminary (Conn.)—Principal Emily A. Rice.

Delaware Literary Institute—Principal George W. Briggs, Mrs. G. W. Briggs.

De Ruyter Institute—Professor Henry C. Coon.

East Genesee Conference Seminary—Principal John Easter.

Elmira Free Academy—Principal J. Dorman Steele, Ph. D.

Fairfield Academy—Principal William A. Brownell.

Fort Edward Collegiate Institute—Principal Joseph E. King, D. D.

Fort Plain Seminary and Fem. Col. Inst.—Principal Benjamin I. Diefendorf.

Gale School (Troy)—Principal Oliver P. Steves.

Geneseo Academy—Principal John Jones.

Griffith Institute—Principal (elect) Addison R. Wightman.

Hudson Academy—Principal Abram Mattice; Professor Harvey R. Schermerhorn

Hudson Public School, No. 3—Principal W. C. Wilcox.

Hungerford Collegiate Institute—Principal Albert D. Watkins.

Lansingburgh Academy—Principal Mrs. Emma H. O'Donnell.

Leavenworth Institute—Principal C. T. R. Smith.

Lowville Academy—Trustee Franklin B. Hough, M. D.

Mechanicville Academy—Principal Bernice D. Ames.

Monticello Academy—Principal Francis G. Snook.

Munro Collegiate Institute—Principal Truman K. Wright; Trustee John Rice.

Newark Union School and Academy—Principal Jacob Wilson.

New Berlin Academy—Principal J. M. Sprague.

Newtonville Classical School—Principal William Arthur.

New York City Public Schools—Inspector Wm. E. Brinckerhoff, Fourth District; Ex-teacher James H. Partridge; Grammar School, No. 35—Principal John M. Forbes.

New York Conference Sem. and Col. Inst.—Principal Solomon Sias.

Norwich Academy—Principal John G. Williams.

Nyack Union School—Principal M. R. Cook.

Oneida Seminary—Principal J. Dunbar Houghton.

Onondaga Academy—Principal Wheaton A. Welch; Assistant J. E. Burdick.

Oswego High School—Principal Emerson J. Hamilton, Ph. D.

Palatine Bridge Union School—Principal P. J. Loveland.

Peekskill Academy—Principal Albert Wells.

Perry Academy—Principal E. Wildman.

Rockland Female Institute—Principal L. D. Mansfield; Mrs. L. D. Mansfield; President A. B. Conger.

Rogersville Union Seminary—Principal Wm. A. Dawson.

Rome Academy—Principal George H. Barton; Mrs. George H. Barton.

Sodus Academy—Principal Elisha Curtiss.

Temple Grove Seminary, Saratoga Springs—Principal Charles F. Dowd.

Troy Academy—First Principal Charles H. Anthony.

Troy Female Seminary—Principal John H. Willard.

Troy High School—Principal David Beattie.

Utica Academy—Superintendent Andrew McMillan.

Utica Public Schools—Ex-teacher Miss Emily Bailey.

West Winfield Academy—Ex-Principal Dodge P. Blackstone.

Whitney's Point Union School—Principal T. H. Roberts.

Williamsport (Pa.) Senior School—Principal Fannie M. Bromley.

Professor David H. Cruttenden, New York city.
Miss Cruttenden, Rhinebeck.
Professor William N. Barringer, Newark, N. J.
Judge Isaac A. Verplanck, Buffalo.
Rev. E. A. Weier, Utica.
Rev. Olin C. Wightman, Mohawk.
Rev. C. Schoepflin, Albany.
Rev. P. P. Harrower, Albany.
William McElroy, Albany.
Alfred B. Street, Albany.
John P. Lansing, Albany.
William H. Belden, *New York Tribune.*
John H. Peck, Troy.
E. D. Lazell, Brooklyn.
Francis L. Capen, Boston, Mass.
Clarence R. Conger, Columbia College,
Henry M. Smyth, Columbia College.
Ira Van Allen, Rutgers College (N. J.)

THE RELIGIOUS CULTURE OF COLLEGE AND SEMINARY STUDENTS.

By Rev. John Easter, A. M.,
Principal of the East Genesee Conference Seminary.

This subject is one of most grave and profound import, and the aid of Infinite Wisdom is needed, that it may be considered with an earnestness commensurate with its importance.

With sad surprise we are witnessing the subject of religious education, embracing in its application all from the common school through the university, held up as a question, and a disposition in many directions to coolly set it aside, as decided in the negative. A recent report, upon religious instruction, says: "The power of thought, of reason, reflection, and self-culture, unbiased by external pressure or external influences, once fully attained, the mind, unfettered by incongruous elements, will seek truth and truth only, and the heart and the life will rise to the comprehension and realization of goodness, usefulness and virtue, with its higher religious nature culminating in love to its Great Creator and to every emanation from his hands." I leave you to remove the sugar-coating from the false theology, the ruinous error herein concealed.

The voice of prayer hushed; all note and comment forbidden; it is now proposed to shut out even the words of inspiration themselves, that the mind of the pupil may be "unbiased by external pressure or external influence." Formerly, we had colleges founded and nurtured by prayer; now, in the desire to be unsectarian, there is danger that we may have, not simply non-sectarian, but even irreligious colleges and seminaries given us. A tide sets in, to meet which requires clear discernment; intelligent, decided and combined action.

I. The necessity of insisting upon religious education for our college and seminary students, and our duty with reference to it, are evident from many impressive considerations.

1. Without it, no institution can furnish what the majority of our institutions promise—a correct, thorough and liberal education.

No individual truth is correctly or exhaustively apprehended, until, in addition to its own nature, there is distinctly seen its relation to other truths. An accumulation of truths, without the arrangement which the Divine mind has given to them, is really a confused, shapeless mass. In that part of education which consists of formal instruction, it is only when God is presented and recognized, as the center and source of truth, that all other truths taught fall into position and form a simple, harmonious whole; and hence, that institution of learning which, in its course of instruction, proposes to ignore moral and religious truth, deprives itself of the possibility of furnishing a correct and thorough education. The second end of education, and which gives to the first its value, is the production of symmetrically developed men and women.

A healthy and vigorous body with a weak mind, or a strong mind with a diseased body, or even the mind alone strong in some directions and weak in others, are regarded by all as imperfect developments. But far more sadly true is it that he who is a mental giant and a moral pigmy, has a development which involves a deformity. Hence, that institution which does not aim to mould its students into Christian men and women, cannot give a correct education.

2. In withholding a religious education from students, we rob them of the most powerful stimulus even to intellectual activity.

The character of those truths which are distinctively moral and religious is such that, more than all other truths, do they arouse and invigorate the mind. Besides, it is impossible to over estimate the inspiration which comes from the sincere desire to find out more of God; while, let it be distinctly and constantly impressed upon the mind and heart that our natural and acquired abilities are but deposits made with us, for which the Great Depositor will call one day; that all we have is God's, and life at once wears a new aspect. Time and opportunity come laden with new and soul-stirring import. Moved by the power of an earnest religious life, plans for future years take shape. Thought takes a wider range, and new and heaven-born aspirations fill the soul.

3. As we have found that a truth often derives its greatest importance from its position in the domain of truth, so this life finds its great significance in its relation to the future and eternal life; and the education which does not aim to prepare for the latter, does not prepare for the former. Our forefathers comprehended this to some extent, and tried to found education upon a Christian basis. Shall we do less for our successors than has been done for us? Have we any right to start the coming generation on the race of life with

such odds against them, and help to make *probable* their *eternal failure?*

II. The *kind* of religious education required must be determined,

1. By the *special dangers* to which students, as a class, are liable. Just stepping upon the threshold of investigation, the mind is intoxicated with a partial view of that which lies near at hand, and is delighted with that which is dimly outlined in the mysterious beyond. With mental advancement, there often comes a self-congratulation over what has already been accomplished, a conceit of knowledge and an impatience of restraint which breaks away from old opinions and landmarks. Intellectual acquirements come to be considered the great desideratum, while moral worth sinks to a secondary position.

The student, at this stage of development, often thinks it is manly and a mark of special ability to doubt. Casting aside the religion of his parents as obsolete, the young man sometimes finds himself, almost before he is aware of his danger, out, without chart or compass, and involved in a whirlpool of contradictions. Our course of education should aim to avert these dangers.

The kind of instruction is to be determined,

2. By *the world's present demands.* The world calls for leaders; and leaders it will have. These leaders will be educated men. Shall they be Christian men? There are wants that abide in our poor, sin-cursed world; but our age brings special calls in some directions.

Never has it been needed more than now that the relation of God's revelation of Himself, in nature, to His revelation of Himself, in the Scriptures, be correctly and distinctly stated.

We need devout Christians and earnest scientists combined. Literature needs to be purified and baptized. The press wants conscientious editors and contributors. Our legislative halls call for incorruptible integrity.

The pulpit wants not crude, nor trite, not even polished essays, but clear, strong, convincing gospel truth. Great reforms want intelligent projectors and earnest supporters.

Everywhere, the demand is for mental endowments and moral power combined; for *Christian culture.* Our training of students in seminaries and colleges should be adapted to meet the world's needs.

III. The *first* necessity for securing this training is *mature, Christian men as instructors*; for, whatever other agencies may conspire to shape the opinions, aims and habits of students, the instructor occupies the place from which the most powerful influence may be exerted. He operates directly and continuously. He should have more than the Christian's name; for the student learns very quickly whether his instructor is a surface Christian or not; one upon whom Christian responsibilities rest lightly. There needs to be maturity also; a character which is the result of prayerful study, deliberate thought and deep experience in the things of God. His habits of thought and action should be correct, in a good degree established and all permeated with faith and love. Christian activity, particularly in those channels which are specially open to him, should be the law of his life. The instructor should also possess a knowledge of men and things. He should be enabled to look out upon society and clearly perceive its moral demands, and the kind of men and influences which are needed to meet those demands. He should know how to mould character, to bring to bear upon each student under his care such influences as will tend to develop him into a truly intelligent, noble man. His eye should be educated to detect the special forms which sin assumes; he should be intelligently decided and earnest in opposing them, and inculcate this opposition by precept and example. There is one other qualification, the lack of which will unfit him for the proper discharge of his duty as an instructor; sympathy with his work.

Concentrate in one man active, personal piety, experience, an intelligent view of the wants of society, an earnest support of the right, and sympathy with the work of an educator, and you have a most efficient agent for the religious training of students in our colleges and seminaries.

Such an educator will rejoice to use the *second means*, which is, *so conducting instruction as to keep prominent the relation of secular truth to sacred truth.*

This relation is apparent, not only in the department of ethics, but may be shown to exist in every province of investigation, whether it be in the growth and structure of language, the varied walks of literature, the abstract and decisive reasonings of mathematics, the varied and wonderful revelations of natural science, or art's embodied aspirations. Probably, not a single recitation occurs which does not furnish opportunities to direct the mind to God; and students may be made to feel that God is everywhere and in everything, by His expressed thoughts and will and the present exercise of His power.

Just here I may be allowed to say, that rather than fall in with the tendency to diminish the attention given to the kind of education we are considering, I would assign *moral philosophy* a more *prominent* place in the curriculum of study than it now occupies. I believe our youth *need* it.

Carefully prepared and well selected text-books constitute a *third* important *means*. This I consider a point which has not received the attention which it deserves. Most students seize a text-book and study the lesson assigned, without pausing to ask whether the author inculcates truth or error under the guise of sophistry.

Thus, I know of at least one mind that received, in its immaturity, seeds of skeptism from a text-book adopted by one of our church schools, and has since been troubled by a bounteous harvest of doubt. I do not question that more harm is done in this direction than we are aware of. Text-books need to be written from a Christian standpoint. Let the instructor, then, in making his selection, keep this carefully in view.

4. Our institutions of learning generally provide for what they call *chapel exercises*. They are often conducted in so formal and uninteresting a manner as to become irksome to many students. Yet they can and should be made so interesting and instructive as to form one of the most delightful exercises of the day, and a power in moulding character for good.

A carefully prepared plan is a great assistance. Portions of the Bible can be selected with reference to impressing some one truth or series of truths; and as the lessons are read, such related facts, explanations and practical suggestions may be given as are the natural outgrowth of the subject. Let the professor seize upon this opportunity to speak a word in season, and its influence may be left on the mind and seen in the life of many a noble young man or woman.

The instructor may do much for his students as they come before him in recitations; but in order to reach them most effectually, he should bring himself into nearer contact, and this can best be done by *private, friendly conversation*. Usually, when the student is thus approached, he at once recognizes the fact that his instructor is actuated by a desire to benefit him. Students need this, for many of them are thrown upon their own resources, with few, if any, to interest themselves personally in their behalf; and this, too, at the period when their habits are being formed and their life-plans are taking shape; when they most need the word of warning or of encouragement, wise counsel and the helping hand. The teacher occupies a position from which he may proffer much aid. Let him, therefore, watch for opportunities to talk with the students under his care, and, generally, he will find them ready and eager to unfold to him their plans, their hopes and discouragements. Let him enter heartily into their circumstances; make suggestions in regard to their habits of study, course of reading—especially for the Sabbath—and constantly place before them the thought that now is the time to give themselves to God and to work for Him; that to be active and effective, as they desire to be years hence, they must be active and effective now; active in religious meetings, and active in personal labor among fellow-students.

In the use of all these means, the instructor who feels his responsibility will carry his work to God, that God may answer with his own strength the question, "Who is sufficient for these things?"

I am aware that the course I have indicated will be deemed by many as ultra, unwise, and out of sympathy with the age; but I only ask all these to try to view this subject now, as they will one day view it from the stand-point of another world.

A LIBERAL EDUCATION.

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The leading principles and forms of what is generally called *a liberal education* in modern times, have their origin and foundation in the general tendencies at the different stages of modern civilization. One of these tendencies, from the end of the middle ages down to our times, has been the introduction of elements of classical antiquity into the life of modern nations. The revival of the study of ancient Greek and Roman literature in the fifteenth century, coinciding with the general reaction against all mediæval tendencies and institutions, gradually caused the whole civilization of modern times to be based on that of the ancient world. One classical element after the other was introduced and assimilated, until, in the course of three centuries, the very nature, or the natural and national peculiarities of the modern nations became altered or repressed. The spirit of Christianity, checked in their life and institutions, and all tendencies of the mind, received their stamp and character from classical antiquity. Modern philosophy, passing over the results of mediæval speculation, proceeded from Plato and Aristotle; ancient mythology took the place of biblical history, art and literature adopted and followed the classical norms, the Roman law almost generally supplanted the common law, the political rulers shaped their governments after the model of the oriental sultanism of the Roman empire under Dioclesian and Constantine, and even, when in the French revolution the political and social principle of liberalism overthrew that of monopolism, the originators of the liberal ideas, although erroneously, identified their tendencies with those of ancient Rome.

And so education, too, was made essentially classical. The Latin became the learned language of Europe, and both Greek and Latin became the substratum of all literary culture, and they preserved an undisputed sway until our times, when gradually a strong reaction set in against this *classicism*, as in other departments, so in the field of education.

The growth of industry and commerce under the political and social laws of liberalism, assisted by the influence of the natural sciences upon the development of technics, and *vice versa*, the rapid progress of the natural sciences, under the encouragement of the ruling industrial and commercial classes, and, resulting from those causes, the enormous increase in the production of manifold material goods, as well as the great and quick accumulation of wealth; all this together produced, among others, two tendencies, which, in strongest opposition to the interests of classicism and classical education, have become more and more general. The first of these is a strong and one-sided predilection for the investigation of nature and the study of natural sciences, a tendency which may be called the *physicism* of the time; the second consists in the preponderancy, in the public estimation, of bodily and material, over spiritual and ideal goods, enjoyments and interests, together with an undue inclination to measure ideal and ethical interests and goods by the standard of utility, as expressed in the standing questions of "what is the use of it?" and "does it pay?" I would call this the *materialism* and *utilitarianism* of our age.

Under these circumstances, the cry was raised for *emancipation* from the classics as endangering the material interests of society, and for substituting in place of the artificial system of classical education, the natural training in useful practical knowledge. And thus the question about the merits of classical studies, as a means of liberal school education, has become and still is, the chief educational problem of the time.

In relation to it, three positions have been taken.

Of the *classicists*, some (as it were, the orthodox fraction) claim that grammar and the classics should, in the same form as during the last three centuries, continue to constitute, with religion, the whole cause of liberal education; others (the rationalistic fraction), realizing the fact that Greek and Latin have ceased to enlist the *practical* or *material* interest which formerly gave them the weight of living languages in the eyes of the educated classes, vindicate for them a predominant position in the collegiate system on the *formal* grounds that instruction in the classics is the best discipline of the spiritual faculties of youth. Wherever this position of a more or less one-sided classical education has prevailed in practice, either on *material* or on *formal* grounds, as in England and Germany, the result has been, that at the end of their college course, the students are one-sided and narrow, without enlarged and expanded views and sympathies, neither harmoniously enough developed in their receptive and productive faculties, nor well enough acquainted with the rudiments of natural and ethical life, in order to make with consciousness a free and judicious choice of a profession, and to understand their natural surroundings.

The extreme votaries of physicism, materialism, and utilitarianism, on the other hand, would exclude classical and literary training as a luxury from the sphere of public education, and confine the latter to natural sciences and other practical studies. Such a course, if it became general, might, to some extent, aid the progress of natural sciences and technics, and promote the material interests of society; but it would, at the same time, lower the standard of intellectual, ethical, and literary training so as to endanger the ideal interests and culture of the nation and even the progress of physical science itself. For true science, for its healthful development requires, on the part of its votaries a true love of science for itself, free from all merely material, pragmatical, and utilitarian views, and such a comprehensive culture of the mind as physical and practical studies alone can never give.

As the truth will generally lie in the middle, and extremes lead either to a compromise or a true reconciliation, so we see, at present, a third position taken by a majority of colleges and other secondary schools here and abroad, in regard to which we must distinguish two sides.

1. In many instances, especially in Europe, a compromise was made in form of a concession to the claims of physical science and modern languages, by adding to the course of classical studies, which, on the whole, remained unchanged the backbone of liberal school education, a somewhat greater amount of mathematics, a greater or smaller number of physical studies, and one or two modern languages. The plan, by such a combination of the two factors, the classical and scientific element, to make the course of liberal education more comprehensive than before, was highly judicious, and would have led to the solution of the problem of liberal education and a true reconciliation of the opponent parts, if the combination had been made organic. Pursuing, as the principal end of liberal education, the plan of imparting to the pupils a sound elementary formal and material culture, the college system ought to have made those two factors a unit, concentrated upon one point, and subservient to one and the same common end, by

using the subject-matter and methods of both like the links of an unbroken chain. Accordingly, the right course would have been, not to attempt to give to the student the whole substance and form of either element, as in a special or professional course, but, avoiding the dangers of cramming and sciolism, to select out of the given substratum just those points and features which are the best vehicles of culture, to arrange them in such order and succession and under such mutual relations as would make them most effective for the purpose in view, and best adapted to assist and stimulate the natural development of the student, and thus to render his progress easy and his study a pleasure, not a fatiguing task.

But in reality, such a course has, to the present time, not been generally pursued, and the combination as it was carried out, has not led to the expected advantages, because, instead of being organic, it was merely mechanical, or external, eclectic, and superficial. The two factors were kept apart, like separate courses, and instead of applying the subject-matter and method of each for the common purpose of methodical training and general propædeutic knowledge, they were treated pragmatically as for the special purpose of philology and scientific schooling. As a rule, the old classical course was retained unaltered and incongruous to the added elements. In most cases it was left so to preponderate that the amount of physical science taught was utterly insufficient, and the instruction in modern languages merely colloquial and practical, without reference to their historical development or their linguistic relations; the knowledge gained in these additional branches remained superficial; and where, on the same basis, the attempt was to make the course of scientific studies more comprehensive in addition to the classical course, the danger arose of overburdening the minds of youth to their intellectual or physical detriment, or both.

2. To obviate this danger, the so-called system of *bifurcation* was formed. It originated about twenty years ago, in France, and has since been introduced in a very large number of colleges in this country. The plan of instruction, according to it, as a whole, represents a comprehensive combination of classical and literary, and of scientific studies with modern languages. But the combined plan, in reality, applies only to the lower college classes, generally the freshman class; and from the sophomore class upward, the whole plan is divided in two coördinate special courses, either of which the students are allowed to select and pursue, namely, a *classical and literary course* of studies for the

humanists, and a *scientific and practical course* for the realists; the former continuing the old programme of classical erudition, or classical and literary education; the latter being, in fact, more or less like that of a practical scientific school. In some instances, also, the students are permitted to elect studies from both courses, and thus to make up and pursue a *mixed course.*

The objections to which this *elective system* is open are very grave. In the first place, the classical studies to the end of the freshman class, are entirely inadequate for the purpose of liberal culture, with regard to all those who enter upon the scientific course; and it is hardly worth while for that end to subject them to a tedious course of preparation, very often mere cramming, in Greek and Latin, before admitting them to the freshman class; especially, as all those who propose to follow the scientific course are indifferent to the study of the ancient languages, and a drag to the classical students. But, in the second place, the system is a logical failure, and leaves the educational problem unsolved. Yielding to the pressure of conflicting interests, it offers to the humanists a one-sided classical and literary, to the realists and utilitarians a one-sided scientific or a pragmatically mixed education, instead of aiming at the realization of the one and only object of the whole college instruction, namely, that of giving a truly *liberal culture to all students alike;* and it stands to reason, that if the college has to give a *liberal* and not a *professional* and *special* education, the first point required in making up a plan of studies should be, to define liberal education, and then to find out and determine its necessary factors, both in regard to the subjects of teaching and to the proper methods of mental training applied to these subjects. In one word, first to lay down a programme of liberal education, and then to apply it and carry it out as the common instrument of the education of all. If then, in the interest of liberal education, it would be found suitable to discontinue after the freshman year, either the classics or the scientific studies, or to make a mixed course, such a course should emanate from, and be laid down and clearly defined by, the college, and not be left to the choice of the students; and it should be shaped in accordance with the general wants of *all* students, and not with reference to special and individual aims and cases. And where individual and special cases should render it desirable to admit students with the privilege of selecting special studies and courses, such students should be considered and treated as *special* students, as a class different from the *regular* college students, whose object it is to complete in college a course of liberal education.

As it is, under this system, the liberal education which the college gives is completed at the end of the freshman year; after which it is made special, practical and professional. And, as in Germany, the students, at the end of their preparatory course, seldom have learned to select judiciously a profession, so, under this system, many must fail in finding their proper practical sphere in right time, because they elect too early a special course, at a time when their general culture is utterly incomplete.

From the preceding sketch of the chief educational tendencies and systems, it appears that there is still a very great diversity in principle and plan with regard to the problem of liberal education. Yet the task of organizing the latter in a natural and consistent manner, is one of the highest importance; for, as Commissioner Barnard says, in his report of 1868, on secondary education, "The aim of the collegiate system is a true *public*, I may add, a *national* education, though it may be obtained by private means." The more elevated and perfect, therefore, the aims and character of public education are, the higher will become the standard of national culture; and, in the same measure as secondary education assumes an empirical, practical, and utilitarian character, the standard of public culture will be lowered. For colleges, and similar institutions, are the nurseries from which, as the beneficial result of a harmonious and complete plan of liberal education, the seeds of civilization and social refinement should be disseminated all over the country.

The following pages are intended for a brief discussion of some of the principal points connected with the problem in question:

It may be taken as generally granted that the object of a liberal education is, to train for practical exercise the mental, moral and religious faculties of the student, by a variety of methods, and by means of instruction in the rudiments or general principles and facts of all those departments of knowledge which represent the diversity of the intellectual world in which we live, and, therefore, naturally belong to the sphere of a man of a higher *general* culture, and thus not only to make him fit for entering into the detail of professional and special studies and pursuits, but also to make him familiar with the phenomena of the world around him, to enable him on entering life, to feel, outside of his special avocation, at home in his natural surroundings; in short, to elevate him to the height of the general education and culture of his time.

Taking this to be the true meaning of a liberal education, it follows at once, that the latter is not *professional*, but *propædeutic*, and not a *special*, but a *general* course. It must, accordingly, make all the studies of the college course common and obligatory for all students, excluding entirely that system of elective studies, which radically spoils and disturbs the harmony and organism of any proper and consistent plan of liberal education. For it does not propose to make *some* students chemists or physicists, or geologers; *others* philologists, but *all* educated men. Not scholars, learned in the details of sciences, but men of general culture. It does not, therefore, teach all the particular facts, but only the results; and not even necessarily all the results; but it has to give the student a thorough, theoretical and practical hold of *those facts and results, by which he can best gain a clear insight in the nature of the respective departments, and be made to understand the way and method by which those and other results were found.* Such a knowledge is not at all the exclusive result of special courses, nor the exclusive privilege of the professional scholar, but fully within the limits of a liberal college education. "The resulting truths of any great scientific work," says Liebig, with regard to popular scientific knowledge, "may be expressed in a few words, and in a plain and simple manner. These few words are lasting, imperishable facts or rules, which it took innumerable experiments and investigations to find. But all these experiments and researches, made by the professional scholar, become superseded as soon as the truth has been found; and the laymen are by no means called upon to study the ways and means by which science attained its results, nor to go over the preliminary experiments and researches, for which they have neither the means nor knowledge, but simply to make themselves acquainted with the general truths or the scientific results of these processes;" and all this may equally be said of the general laws and leading features of the department of mental and ethical sciences. Now, a thorough, theoretical and practical introduction into the knowledge of these facts, truths and results, must, at the same time, be made the means of training the powers of the student for exercise, so that the final result of a liberal college education should be expressed and measured by what the student "can do," and not alone by how much he "knows;" and lastly, in order to bring about this result, the subjects should be taught in that order and combination, and by that method, in and by which they present themselves as best adapted for a natural and organic training of the mind in all its functions.

Applying these preliminary remarks to answer the question what studies should constitute the college course, we are naturally led to recognize and distinguish three groups; the natural sciences with mathematics, the languages, and mental and moral philosophy with history.

The *Natural Sciences* (natural history, physics, chemistry, physiology, astronomy and physical geography) must occupy a prominent place in a course of liberal education. Every student should receive the same scientific training, not only in order to cultivate his taste for the knowledge of nature, but also to test his faculties, to find out in what direction his talent and inclinations lie; if in the literary or the scientific line. And every educated man should have gained a just and adequate idea of nature in her principal forms and problems. His life would indeed be poorly deficient, if he lived and moved in the kingdom of nature like a blind man, without a cultivated sense for her productions, without having a general idea of her workings, her development, her manifold influences and relations to man, without a knowledge of his own nature, without the power of observing and discerning in his walks in garden and field, as well as on a journey in distant lands, what nature presents to his view, without the power even of discovering in her inexhaustible treasury new forms and features which others may have overlooked, and lastly, without being able to follow with interest, to realize and appreciate the progress of the natural sciences, which exercise such an important and beneficial influence on the welfare of mankind. And as thus the study of nature is in itself an essential element in the education of man, so it forms a most efficient and necessary agency of healthful and vigorous mental discipline, by means of cultivating and exercising the powers of observation, attention, clearness of understanding, and memory, the faculty of seizing facts and their relations, of discriminating and testing by experiment and comparison; in one word, by what is called *the scientific method.*

I need not enlarge here on the claims of *mathematics*, both as a mental gymnastic and as the indispensable key for a real understanding of the forms and problems of nature, but will now turn to the more disputed topic of *ancient and modern languages* in the college system.

Ascending from the sphere of nature into the realm of spirit, we find *language* the characteristic sign and attribute of man, the chief instrument by which the spirit reveals or expresses itself. And as mathematics are the key for entering into the domain of nature, so the science of language throws open the spiritual sphere. It teaches man to shape into proper form his own ideas, and to understand those of others, to hold communication with the past and present. It must, accordingly, be made the very backbone of intellectual education. The college has, in this respect, to accomplish three definite tasks.

It has, *first*, to introduce the student into the general laws and the organism of language, by analysis of the mother tongue, in comparison with other languages. The elements of *comparative grammar*, in connection with English grammar and the rudiments of logic, will at no distant period become in all colleges a permanent appendage of the plan of studies. The *second* task is, to train the student in the use of the mother tongue; the *third*, to teach him of other languages; those few, a knowledge of which will greatly contribute to his better understanding his own language, as well as to cultivating and exercising that most important power of entering into, and fully realizing the thoughts of others, and which, at the same time, will enable him to acquire a more than merely superficial second or third-hand acquaintance with the life and genius of those nations who are the exponents of ancient and modern culture and civilization.

On these grounds, instruction in the *English* language, in grammar, rhetoric, literature, elocution and composition, should receive throughout the college course the greatest attention; and even all the other branches of study can and should be made auxiliary to it, by means of exercising the student in fluently, coherently and correctly speaking on subjects with which he has become familiar through his studies, and especially by furnishing him with an abundance of diversified material for that most useful exercise of the productive faculties, compositions and essays. For the student should always have the materials for his compositions ready to hand, in the subjects which he himself has seen, heard, learned and mastered, in order that he may be able to devote all his attention to the form and method, to the accurate, perspicuous and methodical expression and communication of facts. He then will avoid that common cause of the failure of almost all students' essays; that is, he will not have to waste valuable time in straining his brain for original ideas, which at that period of life are usually wanting, nor to borrow indigested scraps of material from cyclopedias, or, generally speaking, to make up by highflown phrases for the want of substance and logic.

Of living languages, besides English, the *French* and *German* tongues are most appropriate to fill up the requirements of a liberal education; the *French*, because it is a constituent element of the English, and in itself a very valuable subject for comparative grammar and mental discipline; the *German*, because it is the sister dialect of the English and the finest mother tongue of Europe; and both, because the French, English and German nations and their literatures have, to the present day, been the representatives and exponents of European civilization. Neither the French, however, nor the German should, as it is now generally the case, even in colleges, be taught merely colloquially and practically, but with as much attention and respect as the other branches of study, in a truly scientific manner, with reference to their historical development, their linguistic structure and relations, and their literature. Written and oral exercises should be instituted for the mere purpose of familiarizing with the rules of grammar, and of better inculcating on the mind the subject-matter, but not for that of teaching to write and speak the language; a practical acquirement which the college must leave to private instruction.

And, now, in regard to the merits of *Greek* and *Latin*, as integral parts of a liberal collegiate plan, I cannot agree with those who would banish either or both entirely, or, at least, restrict them as a study for all to the Freshman class. I would not indeed retain them on the mere ground of their use for professional men. For in as much as the college does not intend a special or professional and practical, but a general, liberal education, Greek and Latin are on that account no more entitled to a prominent place in the regular college plan than Hebrew. But I would sum up my reasons for respecting the claims of these two languages, and, in the next place, of the *Latin*, under the following heads:

1. It is a *dead* language, far remote from our own. A living language is less adapted to be made a means of linguistic training, because, being unfinished and in an uninterrupted process of changing, it does not offer to the mind of the student a complete object for analysis; and it is also, especially his vernacular, too immediate and natural to him to enable him to stand above it, so as to render his observation and judgment clear and objective. The Latin, on

the contrary, is so far distant from the languages around us, that it forms a perfect object of unbiased observation, and it supplies the mind with a finished system of linguistic material, in which all points that it is called to observe are distinct and obvious, simple and definite in classification, offering a concentrated exercise of the cognitive faculties.

2. This advantage of the Latin is heightened by the *difficulty* of its study. The living languages, taught in schools, are too easy to be used for a vigorous training. In an object of study which is too easy, we are apt to run over too much ground, and that with too little accuracy; to neglect and overlook minute points, to form lax and hasty habits of studying. But the Latin, enforcing a close and accurate study and examination, quickens and confirms the habit of thoroughness, and the power of noticing and extracting the characteristic and more delicate points in the grammar and literature of the vernacular, as well as, in general, the ability of fully entering into the thoughts of others.

3. The next, and a very important point of recommendation, is contained in the intrinsic merits of the Latin, both in regard to perfection of grammatical structure, and in its connection with the English and French, and with the Indo-European mother tongues. It is, on these accounts, the best introduction into a general knowledge of the universal principles of grammar, the logic of common speech, and into the study of historical and comparative grammar, or the study of the changes, the laws of growth and development of language, as exhibited in the mutual relations of Latin, French and English, and their connection with the group of Indo-European languages to which they belong. This historical and comparative element of linguistic instruction which the Latin suggests, is for the literary and intellectual education of the student just as legitimate and valuable, as it is proper and useful in his study of nature to lead him back to the antediluvial periods, and to trace the present objects and forms of nature to the protoplasm of Darwin and Huxley.

4. The last, but not the least point, I must mention in favor of the Latin, is the æsthetical and historical value of its literature. Modern art and literature, and the political, social and economical institutions and tendencies of modern times, to this day, have absorbed and contain strong Roman elements, as a leaven, dissolving and transforming mediæval culture. To distinguish these elements and to appreciate their true character, we must have a more definite idea of Roman life

and literature than history and translations alone can give. Whoever has read an oration of Cicero, or of Demosthenes, and compared the original even with the best translations, will truly estimate the difference, and know, that he who does not understand the original, can not fully enter into the spirit and meaning of the author. To say that we could learn and understand Roman life and history just as well without a knowledge of Latin, is the same as to say we could become acquainted with French or German life as well through books and descriptions as by seeing and hearing the inhabitants in their own country. But as a stay in Germany or France, added to a certain knowledge from books, gives a far superior acquaintance than books and descriptions alone, so an additional study of Roman life and literature, derived from the source, goes farther than the study of history alone. And as even a short stay in the country greatly assists in becoming acquainted with the real character of its inhabitants, so it is by no means necessary to read the whole Roman literature in order to conceive a well defined idea of the life and character of the Romans; but from a few characteristic writers, even a few characteristic parts of their works, we obtain a clearer idea and a more vivid impression, a truer tinge of the Roman genius, than from any number of subordinate sources; and to those who say that the little amount of Latin contained in the college course did not yield permanent results, commensurate to the time and labor expended in it, and that it was soon forgotten, I would answer, that the same objection applies to all other studies of the college course. Whatever branch of study we do not continue, we are apt to forget. But, in fact, what we forget, is only the less essential verbal knowledge; while the lasting fruit, the permanent gain, consists in the taste and method which have been developed and cultivated by these studies, and in the lasting general views and impressions which they have given us of the subject, and which serve as true guides toward understanding what we may afterward see, hear, or read in relation to it.

Most of what I have said in regard to Latin, applies to the Greek language. The Greek, it is true, might for mere linguistic training be entirely dispensed with in colleges, as the Latin alone fully accomplishes this end, and Greek would hardly add a new feature. But to introduce the student into a somewhat deeper insight in the life and culture of ancient Greece by means of a moderate autopsic acquaintance with the writings of such authors as Homer, Herodotus, Thucydides, Demosthenes, Plato, and Sophocles, is amply justified by the fact, that the Greeks have, in art, science and literature, been the teachers of the modern world; and have, to the present time, not ceased to be models for literary and artistic production. It will, therefore, also on account of the close mutual relation between Greek and Roman life and literature, be judicious to continue teaching Greek in colleges, as a common study for all.

Yet it seems objectionable to commence Greek as early as Latin and to teach both languages together. The Greek is so difficult that it requires, on the part of the student, a maturer mind than that of a boy preparing for college. Children, from their strong power of perception, are indeed very quick in catching a language which they hear spoken, and it is good for them to begin learning it early; but to do this with a difficult dead language like Greek, is not saving, but wasting time and labor, detrimental to the natural development of the faculties, and the easy and normal progress in all other studies. To teach Greek with Latin, that is, two difficult dead languages at the same time, is even worse. It overburdens the mind and monopolizes the mental powers so as to destroy that necessary element of variety and change of study, which relieves and stimulates the faculties; and it prevents the student from making as rapid progress in other studies, and in either language, as he would make if he studied either alone. These objections are removed by excluding Greek from the preparatory, and the earlier stages of the college course. If it were commenced in college from the middle of the second year, when through the preceding instruction in Latin, French and English, the linguistic powers of the student have been strengthened, and his reasoning faculties have naturally become more developed, he would easily acquire a sufficient knowledge of Greek, and accomplish in it more in the last five semesters, than he would, in the other case, in four or five years. I would, accordingly, propose to teach throughout the college course two languages in each semester; during the first three semesters, Latin with French, in the fourth semester, Latin with Greek, and during the last four semesters, or in Junior and Senior class, Greek and German.

I have so far spoken of the general character and the ends of the course of Latin and Greek; and it remains to inquire into the means, or the plan and method, by which those ends may be best attained.

As it cannot be the object of the college course in Latin and Greek, to educate students in the science of philology, but as it is only a higher preparatory course, the plan should be founded on the principle "*non multa, sed multum.*" Not a great variety of authors should be read, but a few standard authors, such as are most suitable to render the student familiar with the language in general as well as with the characteristic kinds of style, and who, being acknowledged to be the best representatives of their respective departments of literature, are, at the same time, the best sources from which the student may derive a comprehensive and clear idea of the different kinds of literary composition and of the characteristic features of the historical period to which they belong and refer in their works. Such authors are Virgil, Ovid, Horace, Cæsar, Sallust, Livy and Cicero, especially the orations of the latter and his beautiful work on the orator, to the present day the finest of all text-books of rhetoric, and a mine of antiquary, literary and historical knowledge; in Greek, Xenophon, Lysias, Herodotus, Thucydides, Demosthenes, Plato, Homer and Sophocles.

Again, as only part of the works of these authors can be read, the selections made for the college course should be of such a character as to render them best adapted to the before stated purposes. Accordingly, books or parts of books of these writers are most appropriate, from which the student may gain not only a knowledge of the language in general and the particular style of the author, as well as of the subject-matter, in one word, of the form and substance of the whole work; but also a clear conception of the principles and laws of literary composition exhibited in it, and of the historical period of ancient life to which it belongs and refers.

To accomplish this, neither too little, nor too much, but just enough should be read to render the students familiar with the different kinds of literary style, to have them acquire from their own reading a clear and definite idea of the laws of poetical and prose composition, of which these authors have become the leaders of modern nations, and lastly to obtain from what they read a knowledge of ancient life, sufficient to create an interest and an ability of studying to advantage the ancient authors, after leaving college or in a post-graduate course, in a more special and systematical manner. Accordingly, during the first part of the semester, the respective author should be read slowly; but after, by means of careful study, adequate explanations and frequent reviews, the students have acquired a sufficient familiarity with his work, it is best to devote the latter part of the semester to reading it cursorily.

In regard to the method, I would say first, that it ought not to be limited to a mere linguistic interpretation, which formerly so prevailed that Latin and Greek authors were only made the means of studying grammar, and treated as a collection of examples for illustrating and exercising grammatical rules; but to the linguistic and grammatical, the stylistic, æsthetical and historical element of explanation must be added. Hence grammatical illustrations, also, in comparison with the French, English and German, should be carefully given, not, however, so as to make the author merely a basis for teaching grammar and comparative philology; but they ought to be restricted to what is required for making the thought or the meaning of the text fully understood. In addition to the grammatical interpretation of the text, great stress must be laid on stylistic, material, and historical explanation; that is, points of prosody, rhetoric and poetics, of literature, antiquities, mythology and history must be explained as they come up in the text; but these explanations must not deviate from the passage or point in question, nor be made the occasion for enlarging on general topics of history, of literature, antiquities, or history. They should be restricted to the purpose of imparting to the student a full understanding and appreciation of the text, and of thus teaching him the method of apprehending the thoughts of the writer, and of eliciting literary and historical facts and principles. And lastly, in order to make use of such explanations and remarks for introducing the student into the study of the sciences to which those explanations belong, and thus to educate him in generalizing upon special points which have been explained, the teacher will do well, at the end of appropriate periods in the course of reading, to sum up those points in form of a lecture or discourse.

Of written exercises in connection with Latin and Greek, not enough can be said in favor of translations from those languages into English; not, indeed, those so-called literal translations, which in copying the peculiar form of Latin or Greek diction, violate the English idiom, nor those free translations, which are mere circumlocutions and dilutions of the original, but truly literal versions, rendering the original thought in strictly idiomatical language. Such exercises, recommended by the example of Cicero (de Orat. I, 34) and Pitt (Tomline's Life of Pitt, I, 23), are the best school for acquiring versatility, solidity and conciseness of style, and a habit of thorough and accurate reading. Also, a limited amount of exercises in translating into Latin and Greek is useful, in order to make the student familiar with the grammatical rules, but not composition of original Latin and Greek essays, or even poems.

Versification, based on a natural talent, cannot be imparted by teaching; and it is equally impossible and vain to teach writing, or to write a genuine composition in a language for which we have no living standard, and which we do not even know how to pronounce. Even the best productions of so-called modern Latinity in former years, are by no means specimens of ancient Latin; but in our times the use of writing Latin has become so obsolete that the Latin essays and orations are very rarely more than a mixture of incongruous phrases. "For the use of student's writing," says Locke on Education (§§ 169, 174), "let him sometimes *translate Latin into English.* But by all means obtain, if you can, that he be not employed in making *Latin* themes and declamations, and, least of all, verses of any kind. Latin is a language foreign in this country, and long since dead everywhere; a language in which your son, it is a thousand to one, shall never have occasion once to make a speech as long as he lives, after he comes to be a man; and *a language in which the manner of expressing one's self is so far different from ours that, to be perfect in that would very little improve the purity and facility of his English style.* I can see no pretense for this sort of exercise in our schools, unless it can be supposed that the making of set Latin speeches should be the way to teach men to speak well in English extempore. Still more is to be said against young men making Latin verses. If any one thinks poetry a desirable quality in his son, and that the study of it would raise his fancy and parts, he must needs yet confess that, to that end, *reading* the excellent Greek and Roman poets is of more use than *making bad verses of his own in a language that is not his own.* And he whose design it is to read in English poetry, would not, I guess, think the way to it was to make his first essays in Latin verses."

To complete the college course of education, a thorough instruction in the rudiments of *mental* and *moral philosophy*, in the *science of religion*, and, above all, in *history*, is indispensable. They constitute, as Herbert says, the apprenticeship of those who are to take a place in the order of a civilized community. And it is especially the task of historical teaching to transmit and interpret to the new generation the experience of the race, the inheritance of the preceding generations. Without a knowledge of the historical antecedents, it is impossible to understand the religious, moral, political, social, and æsthetical tendencies and systems of the present time.

I conclude with a few remarks on the manner in which the different branches of instruction might be arranged into a comprehensive and harmonious plan of study. Such a scheme would be feasible in theory and practice, and would neither lead to confusion and superficiality, nor to overburdening the students, if, in the first place, in no branch of teaching an attempt were made to exhaust the subject in all its details, since the formal, methodical and rudimentary character of college education must never be lost sight of, or be sacrificed to the interest of verbal knowledge or erudition; secondly, if the studies were made easy and attractive by an order and gradation adapted to the different stages in the natural development of the juvenile mind, and by a combination securing a judicious change and variety; and, thirdly, if a sufficient time of at least twenty hours a week were given to class instruction. As the regular college course is essentially a school of training, of educating the faculties of the student for proper exercise, and of grounding him in the rudiments of the different departments of knowledge, the college only can and must do the greater part of this work. The student can accomplish his ends only by being as much as possible under the stimulating and promoting influence of personal communication with the teacher, and he is, moreover, at that stage of his education, not mature enough for being benefited by a few weekly lectures and for doing most of his studying by himself.

Upon these grounds I would propose to substitute *French* in the place of *Greek* as a requirement for admission into college, and to distribute the following studies over the college course in this order:

FRESHMAN YEAR.

First Semester.—Latin, French, Algebra, Zoölogy (each four hours per week), English and History (each two hours per week).

Second Semester.—Latin, French, Geometry, Botany (each four hours per week), English and History (each two hours per week).

SOPHOMORE YEAR.

First Semester.—Latin, French, Trigonometry, Mineralogy (four hours each), English and History (two hours each).

Second Semester.—Latin, Greek, Calculus with Analytical Geometry, Physical Geography with Geology (four hours each), English and History (two hours each).

JUNIOR YEAR.

First Semester.—Greek, German, Physics, Rhetoric, History (four hours each).

Second Semester.—Greek, German, Physics, Astronomy, English Literature (four hours each).

SENIOR YEAR.

First Semester.—Greek, German, Chemistry, Mental Philosophy, and Historical and Comparative Grammar of the English (four hours each).

Second Semester.—Greek, German, Anatomy with Physiology, Moral and Religious Science, and History (four hours each).

In each college, according to its means and the demands of applicants, besides the *regular four years course*, which should entitle to the first degree of B. A., a regular *post-graduate course of two years* should be organized for teaching special branches of ancient and modern languages, mathematics, natural sciences, religious, moral, social, economical and political science, of history and philosophy, in short for *the auxiliary sciences preparative for strictly professional studies.* Such a course would naturally and appropriately take the intermediate position between the propædeutical college course of four years and the professional school. It would be attended by graduates as *regular* students, who would, on absolving it, receive the second degree of M. A., while any suitable number of such applicants as are not in a position to go through college, yet would be benefited by a partial college course, might be admitted to it, and perhaps even to the propædeutic course, as *special* students, without the privilege of a degree.

THE STUDY OF PHYSICAL GEOGRAPHY.

BY GRENVILLE M. INGALSBE, A. B.,
Principal of Argyle Academy.

Education is progressive, and, like some fairy structure, exhibits ever new and more gorgeous phases. In early times mankind wandered, delighted, in the outer courts and vestibules of her temple, while Greece and Rome first trimmed and lit the lamps of learning. Then, lofty funereal corridors were traversed, lighted only by the thoughts and motives of the past; till, finally, bright beams, flickering and glancing along the richly draperied walls, foretold the close of the mediæval epoch and the coming of the promised day. We now stand at the entrance to the inner court, and see, within, wonders before which the dreams of the enthusiast fade; sacred shrines, fantastic fountains and lofty aisles; all worthy of some celestial fane. Dazzled by the enchanting vision, we may make false steps, at first, in our endeavors to benefit the youth of our generation, through the medium of the new education. Errors have been and will ever continue to be inseparable from a crisis time in history or thought. Lured on by inviting and fascinating because yet unexplored regions of investigation, we may ignore the well known and essential; but the true idea will live on; and from blunders, opposition and overzealous support, will be evolved the true culture of our age and land. It will not be all new, for it will not reject the past. It will consider priceless the heritage from preceding generations, and in its wondrous composition both the traditional and progressive shall enter. Whatever of worth has descended to us, it will reorganize and assimilate to itself. It will be a union of the old with the new, from which shall result a system of national education, developed in harmony with the genius of American ideas, and the absorbing requirements of the era.

The development of this new education is the great problem of the hour. What kind of culture shall the youth of the land possess, is a question profoundly agitating the minds of all worthy educators. It is a "new departure," involving questions of more vital import than tariff, finance and suffrage; for, properly solved, not only will the beginnings of thought be rightly established, but its sequences will ever add to the glory of our golden age.

One important factor, in my opinion, in the education of the future, is the free and exhaustive study of nature. We need earnest inquiry into the relation of things; the careful and systematic cultivation of independent thought and judgment, and thorough study in the rich fields of the living available truth of to-day. This culture must take the place of the mechanical acquisitions, the antiquated and worthless forms, and the blind dependence upon preceptor and text-book which still too largely prevail in our educational courses.

The unfolding of the physical sciences, in their marvelous beauty, has been reserved to our day. Even now they are not sufficiently appreciated; but we gladly note that the signs of the times prophecy full recognition of their worth and power in the proper development of the "Culture demanded by Modern Life," and that soon they will be considered as constituting a necessary part of every liberal *curriculum.* Already, laboring disconnectedly, without an indication of their herculean power, great results have been attained. In the new order of things now being inaugurated, science speaks in prophetic tones of the mind's great future, and claims her imperial position as proprietor of its unfolding destiny.

Alexander Von Humboldt, while adding incalculably to our knowledge in every department of science, may be considered as the father of physical geography. Till within the last decade, it has not been popularized in attractive text-book form. Within this period, however, through the indefatigable efforts of physicists, it has received the most valuable acquisitions. Still in its infancy, destined to be a completed science only when air, water and life shall have impressed their last autobiographic word upon the tablets of earth; yet now it merits the attention of educators as one of the foremost of the physical sciences, both in absolute intrinsic importance and relative disciplinary value.

The traditional method of teaching geography produces results wholly inadequate to the great amount of time bestowed. The study is commenced at a very early period, and continued in a most unphilosophic way until the age of fifteen or more. The enterprising student will memorize a great mass of facts concerning the location of places, the beauty of cities and the grandeur of public works; but these details will lack homogeneity, and from their crudeness, unsystematized method of acquisition, and confusion of arrangement, they will be of little practical value. A few years later and they have been forgotten, and the location of the most important places only is retained. Question the young men and women of to-day, and you will become convinced that there is something radically wrong in geographical training. They are ignorant .of the extent and influence of air and water currents, of the laws governing the distribution of the world's fauna and flora, of the influence of climatology upon the physical and mental characteristics of men. Failing upon these fundamental topics, they will fail in the elucidation of facts depending in much closer manner than is usually supposed upon these; as, the resources, population and power of different nations, and the routes and vicissitudes of travel between the great centers of industry and trade.

Geographic discovery was never more active that at the present hour. Secrets which the ages have guarded with jealous care, stand revealed before the nineteenth century energy of our Fremonts, Kanes, and Livingstones. The people are looking for a purer life, and instinctively they turn to that land over whose broad valleys, and giant mountains, float the stars and stripes. Accessions to our population have been made from every zone. Like accessions will continue, and it is our great mission to form from the incongruous mass a homogeneous people, who shall valiantly uphold, and constantly advance the principles of law, liberty and Christianity. The restless energy of our population pushes before it the borders of civilization, and to meet the needs of growing communities, new territories and States are demanded yearly. Commonwealths as powerful as empires rise from the central and western portions of our continent.

To-day* Europe glows with hostile camp fires. The needle-gun or chassepot rifle echoing along the smiling valleys of the storied Rhine, is prescribing new boundaries for the potentates of the eastern world. Breadth and symmetry of culture will have the victory. Let us hope for the vanquished, that, heeding the bloody lesson, they may become the champions of universal education, as they have been of liberalism in the past. It was France that gave existence and vigor to American liberty, and France which has been the inspiration of the European movements of the century, toward free government.

It is evident, from this brief outlook upon the world's activity, that our youth should be so taught geography that they may comprehend with unerring instinct the location of changed boundaries, and the relative position of new States. They should be acquainted with the products and capabilities of production of all portions of the habitable globe, that they may know what staples may be needed in case of drouth, or warlike combinations, and they should understand the physical features of every country, and the climatic and other influences which have tended to the development of the national and individual characteristics of those millions which emigration will land upon our shores.

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* August, 1870.

How are these ends to be attained ?

Unhesitatingly we answer by the teaching of geography, according to the true relation of its several branches. The ordinary method of considering the political department of the science only, or at least primarily, has introverted the natural order, and wrought the most serious results. Physical geography is fundamental to all the other branches of the science. It treats of the immutable laws of nature, and the phenomena which influence and mould the varied forms of life. Upon it alone can a thorough knowledge of history and political geography be based. The Germans happily call geography and its rudiments *Heimathskunde*, or "knowledge of home." When it is truly made such, the highest results will be attained, and our geographic knowledge, instead of fading from memory, will be refreshed by our general reading, and we shall find it brighten with the flowing years.

Before passing from the consideration of the direct connection between physical geography and ordinary geographic training, I cannot refrain from expressing my pleasure that the questions in geography for our late preliminary examinations have required familiarity with physical geography. As upon many other topics relating to the examination, the honored secretary has, in this matter, acted with excellent judgment, and he deserves the sincere praise of all who desire geography to occupy its proper position in the academic *curriculum*. I hope the course of this official may meet the approbation of the Convocation, and that these questions may henceforth be of such character as to render futile the efforts of any youth to pass the examination unless fairly posted upon the principles of physical geography. This course is demanded, urgently, by the great interests at stake. Ignorant of that upon which all geographic requirement rests, we submit if one is worthy of a certificate of academic scholarship, bearing the sanction of the University of the State of

New York, and the signatures, even in *fac-simile*, of her worthy Secretary and Chancellor.

Thus far we have considered physical geography simply as auxiliary to ordinary geographic training in the education of youth. This is but a limited part of the beauteous field through whose wondrous mysteries this study invites us to wander. It spreads most inviting prospects before all who strive for the higher culture of head and heart. It fascinates alike the eagle-eyed man of science, and the most quiet lover of nature; the daring explorer who would leave some new mountain peak as a heritage for children's children, and the Thoreau who communes with the genius of solitude, and exclaims, in an ecstasy of delight:

"I hearing get, who had but ears,
And sight, who had but eyes before;
I moments live, who lived but years,
And truth discern, who knew but learning's lore."

This knowledge is not reserved for the ambitious savant who scales Himalayan summits or rides on oceanic wave. It is taught by the great activity of matter, manifesting itself in the play of light and shade; the trembling on the air of forest leaves; the murmur of the tiny cataract dashing itself against the stones, and the prismatic hues of the morning's beaded dew-drop. The rivulet's course, the pebbles in its bed, the grains of sand upon its winding banks, and the little ripples made by the wind in the more sluggish portions of its current, have far-reaching lessons for the mind attuned to the subtle harmonies of creation.

The waves that moan along the shore,
The winds that sigh in blowing,
Are sent to teach a mystic lore
Which men are wise in knowing.

To the varied phenomena of matter, add those of life. By the harmony of its forms, the rhythmic distribution of its exterior features, the purity of the air which envelops it, and the light which colors it, the surface of our planet is of surpassing beauty. But it is the infinity of its living organisms which gives it peculiar grace. Life is the Kohinoor in the sparkling coronet of time. Its varied manifestations, though as old as the centuries, are ever new. They are the unknown factors in the equation of existence, yet in myriad forms. Life is all around us, while the whole continental and probably the whole oceanic area is a vast charnel field, covered with humus formed from the disorganization of the life of preceding ages.

Confined to the present, a grander era than the fabled golden age, physical geography describes the earth as it exists to-day. It has not the ambition of geology, which attempts to reproduce the history of past epochs; but it collects and arranges facts and discovers the laws of formation and destruction of strata. It traces out the path for the geologist, and by its revelations of actual phenomena, facilitates the deciphering of those rude, blurred hieroglyphics on the pages of earth's rocky album which treasure in their embrace the history of countless eras. It would be impossible to take a single step without it in the enchanted labyrinth of the centuries.

Recent results of deep-sea dredging reveal the influence of physical geography upon the finely elaborated theories of the geologist. Contrary to the general belief, life in great variety of species and remarkable generic forms, extends to the greatest oceanic depths. Descending over two thousand fathoms, old ocean's bed yields to the dredge of the physicist, radiates, molusks and crustacea in richest profusion. These animals engage in the struggle of life, surrounded by water with a temperature little above the freezing point, and containing nearly fifty per centum of carbonic acid gas. They subsist upon chalk animalcules which, in turn, find their support in the organic matter diffused through the waters of the deep ocean. Busy as the sooty workers in the fabled vaults of Vulcan, they toil ceaselessly in the great laboratory of nature, and, finally, cast their own bodies into the mystic crucible, that, after the lapse of uncounted ages, new continents may arise fitted for the abode of the "coming man."

The present land areas were moulded and fitted for the abode of terrestrial organisms while yet under the surface of the waters. The poetic expression which occurs in the cosmogony of so many primitive peoples, that the earth is the daughter of the ocean, is no fable. The study of the rocks proves, and physical geography teaches, that the process of land making is still going forward, not alone on the borders, but in the deepest recesses of the ocean.

Investigation into oceanic currents is also within the domain of physical geography. Their influence upon climate and life is almost incalculable. Unknown plants and the bodies of strange animals floating in the waters of the Gulf Stream, first suggested to Columbus the idea of a continent beyond the western ocean. These currents are nothing else than the ocean itself in motion; the rivers of "Homeric song," grander and more impetuous than Amazon or

Mississippi. They are rendered difficult of observation by their dependance upon seasons, winds, configuration of coasts, and especially by their submarine courses. Happily, successful observations are rapidly multiplying. Every new sounding, every new reading of the water thermometer is an acquisition for science, which already has settled many questions in planetary economy.

Observations upon the water thermometer and the flora and fauna of the north seem to be leading toward the speedy solution of the last great geographic problem of the ages. Central Africa has disclosed her wealth of inland seas, and Speke, Baker and their daring compeers have wrenched from the "Genius of the Waters" her century guarded secrets. But the mysteries of the pole remain. No explorer has ever scaled its icy ramparts, though for four centuries noble spirits have suffered and died in the undertaking, and their bones whiten many an iceberg girded isle. Recent investigations serve to indicate that all this time the crystal gates to the open polar sea have been wide open before the inflowing Gulf Stream. Apparently, the light of science only has been needed to point out the pathway to success. Obeying the indications of the water thermometer, the icy gauntlet may be run, and the great enigma solved. I do not stop to ponder upon the results attendant upon this achievement. It will be a triumph for science, and may affect all the commercial nations, by affording a new and advantageous channel for the travel and commerce of the world. It may be accompanied by results more important than yet considered by the most enthusiastic. Columbus sailed in search of a short highway to the Indies, and discovered America; De Soto, seeking for gold, found the "Father of Waters." Locked in the embrace of the circumpolar region, may not toiling humanity find some precious boon? Whatever may be achieved, grant the honor to the untiring physicist.

Thus, in myriad ways, physical geography affects the well-being and aspirations of men.

Its relations to the true conduct of life are most intimate. We receive from it too often, heedlessly, the knowledge of that which serves to embellish or degrade the earth. The unfolding of humanity coincides closely with the aspects of surrounding nature. A beautiful harmony subsists between the earth and the peoples whom it nourishes, and when societies lay a ruthless hand upon the exterior beauties of their domain, grief and decadence follow with unerring tread, impoverish the soil, deprive the landscape of its wondrous poesy, and the imagination is weakened, while servility and routine seize upon the souls of men, and incline them to torpor and death.

Prominent among the causes contributing to the downfall of successive civilizations, has been the violence manifested toward nature by nearly all peoples. Having leveled the forests, they have dried up the river courses and poisoned the climate. The earth presents many instances of this pitiless devastation. A great part of Asia Minor, which formerly flowed with milk and honey, has become sterile, and is now inhabited by miserable tribes, living by pillage and the rudest agriculture. When the power of Rome was crushed by the barbarians, many of the neighboring provinces, exhausted by the unintelligent husbandry of slaves, relapsed into almost primitive solitude. After two thousand years, worthless lands and pestilential marshes mark the spot where once flourished the inimitable gardens of Rome.

From the same cause that contributed to the downfall of the nationalities of early ages, our country has lost some of its richest lands. Many a southern plantation, conquered from the virgin forest by the sturdy pioneer within three quarters of a century, has relapsed into wilderness, owing entirely to the ruthless pillage of its soil. Let the present ignorance of physical geography continue, or in more explicit language, let man persist in disregarding the needs of the soil, and the earth is lost. Soon may we not learn of the infertility of our prided prairie lands, and the western traveler be greeted by barren wastes where to-day golden harvests wave?

The nationalities now composing the advance-guard of humanity are more industrial than artistic; preferring force to beauty, they sacrifice everything before the gilded shrine, utility.

From a high vantage ground, let us seize upon the auspicious moment, and labor that our youth be duly trained in the knowledge of their relations and duty toward the earth. Our nation has untold capabilities for production and opportunities unequaled for beneficent influence upon other peoples. Husbanding these resources with zealous care, our land will become more inviting each added year. The beauty of earth and the rhythm of her forces will then be fully recognized. Men of art and science will find in nature their brightest visions of the beautiful, and the fostering touch of man shall make the budding, even of our landscapes, to be in perfect harmony with the inner sentiments of our people.

The duty of man toward the earth will be one of the primal elements of that education which shall nurture the modern American man, to an intellectual stature beyond and nobler than the dream of the veriest visionary.

Progress in morals and religion will correspond to advancement in learning. The beauty of earth and the nobility of man will unfold and attain their full perfection together. For, as foreshadowed in the weird mythology of the North, where the antique Frya was at the same time the goddess of earth, and the goddess of liberty, our beneficent mother will be truly beautiful only when all her sons embrace as brothers, fellow-citizens in the world-wide confederation of the free.

LECTURES AND TEXT-BOOKS.

BY JOSEPH ALDEN, D. D., LL.D.,
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I once asked a pupil why he chose a particular heading for his piece, since there was little, if any connection between the heading and the piece. He replied, that he thought it would look well on the schedule. Perhaps the author of the schedule before you entertained a similar opinion. You will not find a very intimate connection between the heading and the essay. Something, however, will be said respecting text-books.

When the universities of Europe were established, teaching by lectures was a necessity. Universities were established long before the art of printing was invented. They retain the practice of instruction by lectures to this day. Hence, it is regarded by many as the highest form of instruction. Hence, some of our institutions lay great stress on the courses of lectures which are delivered or promised in addition to the regular course of study and instruction in connection with text-books.

It seems to me that we should ask, not what they do in Germany or anywhere else, but, what is the best way of training the minds of our pupils? To determine this, teachers should freely express their views to one another, and especially the result of their experience.

The observation and experience of the writer has led him to place a low estimate on lectures as an educating force.

He has been present at lectures by which important truths were clearly set forth in accurate and ornate language. The impression received by the students was that they had heard a splendid lecture; that the lecturer was an able man. Beyond this, there was nothing definite. There was no such reception of truth as would make it influential on subsequent trains of thought.

The subjective condition of the student's mind was but slightly changed by the lectures. Had the same truths been set before the mind by colloquial discussion; had the student's mind been placed, by skillful questions, in an attitude to see those truths for himself, and had he been required to tell them to his teacher, they would have strongly influenced his subsequent thinking.

It may be said, the student should take notes of the lectures and be examined upon them. If the student simply repeats what he has heard, it is not certain that he has learned anything. If the examition be a description of the subject, it should precede the lecture. When a subject has been thoroughly discussed, when all the questions of the student have been answered, when the teacher is satisfied that the student has seen all the points in detail, it may be well for him to give a lecture which shall be analogous to the summing up of the judge.

The teaching most common in this country is in connection with text-books. A lesson is assigned which the student is expected to learn, that is, to commit to memory, at least so far as ideas are concerned, and to understand so far as he is able. At the recitation the teacher is expected to explain the lesson, to make everything clear.

The explanation ought to precede the study of the book. It is unwise to require the student to commit to memory propositions; words which awaken no ideas in his mind. Memory was given us to remember what we know, not what we do not know. It is not affirmed that he should count as knowledge and commit to memory only those things which he fully understands, for, in that case, he would commit nothing to memory; but that he should not commit to memory forms of expression which to him are without meaning.

Most of the text-books in use, and out of use, contain truths expressed in the most condensed and general form. Their makers seem to have proceeded on the assumption that the mind first perceives general and then descends to particular truths. Now the fact patent to every observer is, that the mind, in acquiring knowledge, always begins with particular facts, and proceeds to general facts. It can acquire knowledge (except by testimony) in no other way.

It cannot perceive a general truth until it has perceived one or more particular truths exemplifying it. State any general truth, such as "all material bodies have gravity;" or, "all men are mortal;" or, "the whole is greater than its part." The mind cannot perceive these truths until it has previously perceived an individual fact of gravity; an individual fact of mortality; an individual fact or exemplification of the truth that the whole is greater than its part; unless the mind has perceived these individual facts, the words expressing the general facts are, to that mind, as destitute of meaning as the words of an unknown tongue.

Hence, the student should begin with individual truths, although, unfortunately, general truths will meet him at the outset in almost every text-book.

Text-books, as they are, should follow, not go before the instructions of the teacher. The subject should be taught orally. Skillful questions should lead the pupil to make as many sound inferences as possible. Truths thus reached are his own by a different tenure from that of memory.

When the student has thus gone over the subject, point by point, the text-book may be intelligible and useful. But to this end, the explanations, or rather the instructions, of the teacher should precede the study of the text-book. The fact that it may lead to a rejection of the text-book, does not affect the truth of my position.

The most objectionable text-books in use are those relating to history; history for schools. I have sometimes thought that the study of such books is adapted to give one about as much knowledge of history, as the study of a concordance would of the Bible. All the words contained in the Bible are in the concordance. Still it is not a very interesting and instructive book to study. One could not learn from its study many of the facts and doctrines of the Bible. And one cannot learn many of the facts and principles of history from these text-books.

Their condensed statements and allusions may be intelligible to one who is familiar with the facts of history, and very unintelligible to those who are obliged to study them. A class-book in history that should contain only such statements and allusions as the pupil can understand, would be a great blessing to the rising generation.

Some teachers discard text-books altogether. They present to their pupils truth in what they regard as a more excellent way. Cannot their utterances be printed? And would they not be as valuable to their pupils in type as in manuscript? It seems to me that the pupil would thus be saved the mechanical labor of constructing his text-book at the dictation of the teacher.

Besides, some can practice this more excellent way better than others. Some know how to teach better than others. By means of the press, their skill may be made available to those less highly gifted. It will be well for the cause of education when text-books are made by skillful and experienced teachers.

PHYSIOLOGY IN RELATION TO PSYCHOLOGY.

By Cornelius M. O'Leary, A. M., M. D., Ph. D.,
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The special feature of modern education is the uniform and co-ordinate study of all branches of science, and the elevation of the natural sciences to the front rank. Ever since the value of the inductive system was recognized, and the observation of physical phenomena admitted as a basis of true science, the claim of mere *noumena* to the exclusive title of scholastic philosophy has been denied. No matter how absurd were the physical theories of Descartes, his famous *vortices* for instance, so long as his psychical doctrines were characterized by depth and ingenuity, his reputation as a philosopher remained unblemished. But the increasing importance of the physical sciences by reason of the vast contribution they have made to human comfort and progress changed all that, so that the most brilliant reputations are now built upon discoveries in chemistry, physiology, microscopy, and kindred sciences. These now occupy the highest niche in the temple of knowledge; and those sciences which once had a separate and distinct existence shine with the lustre reflected by those latest products of human intelligence. But this reaction was violent as it was sudden, and in the headlong race of modern science, some truths have been overlooked which were held in reverence by mankind for ages.

There is no belief of more ancient date or of wider prevalence than that which ascribes mental phenomena to the soul, a spiritual substance, distinct from the body, and differing from it in its essential characteristics. Indeed, so deeply implanted is this belief in the minds of men, that but few even of its boldest opponents dare categorically disavow it; and yet this is the truth which suffers most severely to-day from the tone and direction of modern physiological teaching. The object, then, of this paper is to show by what processes modern physiology got into this anti-spiritual groove, and to suggest a means of remedying the evil without attempting to suppress that spirit of inquiry now abroad through the world, the well-spring to mankind of incalculable good. The easy and unphilosophical explanation of the phenomena of life given by the vitalists, made it a less difficult matter for the science of psychology to maintain the ascendancy, as all apparent inconsistencies between spiritual and vital manifestations were at once and conveniently referred to that mysterious agent tidal force. When, however, the question arose as to the nature of this mysterious dynamic force, the difficulties all returned, and it was found that a mere name had been received for an explanation. Thus, as when Torricelli discovered that nature did not abhor a vacuum and that the maxim had been adopted as a cloak to ignorance, many rejected vital force as a mere figment, and strove to find an explanation in the facts of physiology. The discoveries made in organic chemistry, and the analogy between chemical processes and the operations of nature in the animal economy, suggested a chemical theory of digestion and secretion. Facts were found in entire accordance with surmises, and every step of the digestive process was at once satisfactorily explained by chemistry. This substitution of chemicalism for vitalism, was the first step toward the more recent theories; and yet, before the heat of its triumph had cooled, the new doctrine was forced to acknowledge that growth and assimilation take place in contravention of its laws. The more ardent chemicalists in France and Germany concluded that a fuller acquaintance with the laws and principles of organic chemistry would enable them to refer all phenomena of life to its operation, including those functions previously believed to be the exclusive product of the soul. But life itself was an unchemical process, and met by this difficulty and forced to acknowledge their ignorance on a point so vital to their doctrine, Cabains and his followers were forced to repudiate their new system of materialism. The discovery of the anæsthetic properties of ether soon renewed the controversy, however, for the experiments of Flourens which led to the localization of the brain functions, inspired the hope that all vital operations would be found to proceed from changes occurring in the nervous tissue. After many careful trials, M. Flourens noted these results, first that the action of ether suspends the power of the cerebral hemispheres which preside over intelligence, then the action of the cerebellum, which regulates and co-ordinates movement, is suspended, and finally sensation is extinguished, together with voluntary muscular action. But the power of the spinal cord to support organic life is merely diminished when the other phenomena are complete; and so, with suspended movement and sensation, respiration and circulation are still carried on. This separability of the different functions of the nervous system, as exhibited in the phenomena of anæsthesia, was the first step toward the localization of function, and opened the way to numberless hypotheses. Not confining themselves to the facts, some physiologists declared that as certain operations, believed to be vital processes, had been traced to a local and consequently material origin, so memory, will and intellection proceeded from the same source, and that with the perfection of chemical and physico-chemical modes of investigation, the condition and changes in the nervous structure on which those various processes depended would be satisfactorily revealed. Thus reasoning, they claimed *a priori*, all vital phenomena as the proper and legitimate objective point of their science, and claimed the material origin of thought ere they attempted to demonstrate it. Only last year, a professor in one of the European universities unhesitatingly declared, that the chief bar to the progress of physiology is the belief that there is in man a principle of action distinct from the body, a spiritual substance, the source and origin of mental phenomena; a substance not to be investigated by chemical and physico-chemical appliances. If physiology, he said, is the science of human nature, having for its object the investigation and explanation of the phenomena occurring in man, the belief that those phenomena which we call thought, in its varied forms, are excluded from its researches, narrows its field of inquiry at the outset, and discourages the prosecution of its aims. It is not often, indeed, that those materialistic views are thus boldly stated, for many who profess the new doctrines verbally admit the existence of the soul. The importance of reconciling the doctrine of a spiritual substance in man with the most recent discoveries in physiology, cannot be over-estimated when we reflect that, in accordance with the most approved plan of education, equal prominence is given to physiology with the other natural sciences, and that, above all, the minds of the young must not be contaminated with the doctrine of materialism. It is true, physiology has shed a flood of light on many of the mixed operations of human life, those in which the soul and the body are intimately associated. The investigations of Flourens, Virchow and Draper, for instance, have certainly placed us in possession of many interesting and wonderful facts which would never have been brought to light but for the recent progress of chemistry and microscopy, and which enable the psychologist to conduct his investigations on a more rational basis. But when science, running ahead of facts, plunges into hypotheses, it no longer deserves the name, it degenerates into scientific charlatanism, and this we find to be the case with many of the speculations of Herbert Spencer, Huxley and Owen. They confound the condition with the cause, and finding mental phenomena modified in character and degree by the peculiar structure of nerve tissue and the changes occurring therein, they conclude that the nerve tissue itself is the source and cause of the phenomena manifested through it. Even should physiology be enabled to localize every known function from sensation to the subtlest conceptions of the metaphysician, a consummation we all heartily desire in the interest of true science, the only conclusion it is justified in establishing is that the manifestations of the soul through the nervous system, its medium of operation, are thereby modified in character, and that such special examples as memory, will, hope, fear, imagination, and the endless forms of thought, depend on the greater or less fineness of organization belonging to the various portions of the nervous texture. How would we regard the man who, beholding a flood of glorious light flash through the parti-colored panes of a cathedral window, assumed that the stained glass was not the mere medium of transmission for those regal rays of red on those softly radiant shafts of mellow amber and emerald rich, but that it was the very source and well-spring of that luminous grandeur? That the sun beyond, which bathes the universe in light, sheds but a few scattered beams of his magnificence on this incomparably insignificant surface, is a thought too expanded for his narrow mind. As he discovers in each parti-colored pane the condition of the difference in the rays, mistaking the condition for the cause, he assumes not only the difference between the rays to depend on the color of the transmitting medium, but he deems that medium to be itself the sole source of the light. In like manner, the speculative and transcendental physiologist, mistaking the medium of the manifestation of thought for the thought itself, confounds the human soul, by which we are lifted up and likened to the Deity, with the gross and perishable body in which it is imprisoned, and through which it most imperfectly reveals its own glorious essence. This illustration is suggested merely as one mode of reconciling the latest teachings of physiology, which are founded upon facts, with the essential truths of psychology; for the problem demanding solution is, how that most important science may be taught in our colleges and academies, without undermining the cherished belief in the spirituality of the soul. One thing certain is that our psychical theories are not constructed with the view to combat and forestall the dangerous doctrine which refers all to the nervous system. Psychology seems shy of the light which chemical and microscopical physiology has thrown on many of the vital operations; for, instead of accepting the marvelous data of the latter science and striving to reconcile them with its own essential features, it still runs in the same channel fashioned by Reid, Dugald Stewart and Brown. Though physiology is concerned with the purely animal operations, and psychology relates to those processes we call spiritual, that is, independent of the body, still, as both occur in the same subject, the relation of both sciences is most intimate, and both should progress *pari passu. Altera alterius poscit opem res et conjurat amice.*

If the rapidly progressing changes which work the career of modern physiology necessitate a constant change of text-books, how can we be satisfied with psychological doctrines to which no accession has been made for fifty years. Truth is undoubtedly unchangeable in character, nor can that which has once been established beyond question succumb to the advances of any newer science; but the field of inquiry is widened in every department of knowledge by the vigorous prosecution of organic chemistry and microscopical physiology, and it is maintained that unless the advocates of a spiritual principle of thought thoroughly sift the fast accumulating data of those sciences, and adjust their legitimate conclusions with the essential requirements of the spiritual doctrine, they favor the spread of a most pernicious, because a most insidious materialism. The positivism of Comte is perhaps the most logical and formulised expression of this material physiology; for it recognizes no truth but that which experience alone establishes. And yet how inconsistently do not the English disciples of this philosopher rush into theory. The protoplastic cell evolution theory is pure invention of the fancy; for who, with the most powerful microscope, ever gazed on one of those primitive homogeneous cells? Who ever witnessed a single change in the series by which that cell is transformed from its simple state into that amazing variety of living structures with which the world teems? and yet such science rejects a spiritual soul, because it is an unknown product, not contained in the protoplasm nor evolved in cell development.

It is true that all organisms are the result of cell life, but so far the microscope has enabled us to determine only a special nucleus for each organism, on the shape and mode of development of which depend the peculiar functions of the organ which springs from it. The latest microscopists give two fundamental modes of development; the one taking place by a division *de novo* of the cell itself, the other by the creation of new cells through the operation of the vital forces in a fluid prepared for that purpose. The secondary modes of development are more numerous, but the chief among them are duplicative subdivision where the parent cell itself is split, giving rise to two or more new cells; and endogenous development within the cell where the nucleus is split and the parent cell perishes. These are the facts of microscopy, as observed under the lens, and these facts alone can be truthfully predicated. Sound physiology then enunciates this law that all living organisms are the product of elementary cells, the difference in which determine the differences of the product. In those facts we find no trace of spontaneous development from a homogeneous cell containing the germ of all being, but a doctrine entirely compatible with a belief in the spirituality of the soul. In closing this paper I may again be permitted to invite the attention of all interested in this fundamental belief of Christianity, and indeed of all religions, the existence of an immaterial principle of activity in man, to the insidious speculations of recent physiologists who covertly and in the name of a magnificent science, aim their shafts at the most widely diffused belief of men. And as experience has amply proved that no error can be so well combated as by giving it a due and impartial examination, let not only the simple processes of life be the subject of physiological teaching in our colleges, but let Huxley, Owen and Spencer be heard betimes, and if any refutation of their views be needed, let it be given ere the poison of their doctrines be instilled into dazed and unresisting minds.

BODY AND MIND—THEIR CONSERVATIVE INFLUENCE ON EACH OTHER.

By Mrs. Clemence S. Lozier, M. D.,
Professor in the New York Medical College for Women.

There are two extremes of bodily condition induced by the habits of those who represent them. The first is observed in the persons of those who are raised from childhood to severe daily toil and hard plodding labor, from the time they are large enough to perform labor at all, until they arrive at the meridian of life, without being instructed in a knowledge of the physical powers and capabilities of the human system, with very limited development of their minds (the great quickening and controlling influence of personal bearing and demeanor).

This class have been accustomed to heavy lifting, and hard work beyond their healthy muscular power, and to over-doing, while their bodies were in the process of development, as well as after they became matured. Instead of laboring eight hours a day in such a manner as their muscular strength would allow and maintain its natural tone and elasticity, they have overtaxed and subdued its natural susceptibility and readiness to free and easy action. Hence, they appear stiff-jointed and awkward in their movements, and their harmonious development and graceful carriage are destroyed.

The second extreme is observed in the literary man, and all others who have been brought up in strictly sedentary habits.

These have exercised their muscles so little that they have become relaxed and flaccid; and their arms and limbs loosely swing about as the law of gravity dictates. Their muscles, unaccustomed to active and energetic action, have not power to perform the service the Great Designer intended they should accomplish.

The first class of persons mentioned overwork their muscles, and the consequence is a degree of inflexibility.

The second class exercise them so little that they never assume their vigor, strength, or tone at all, and consequently are feeble and inefficient.

The weary eye, the cramped limb, the demands of the body, all are neglected, from the all-absorbing nature of the pursuit, and a train of evils must necessarily result which are naturally enough, but perhaps too readily, laid to the account of mental labor, but which result with equal frequency from all sedentary occupations whatever. The day laborer takes on board so large a cargo and sinks his vessel so deep that it plows straight ahead, little heeding the rudder. The literary man neglects to take even enough for ballast, and consequently his vessel makes most ungainly lunges.

Actual daily labor, of a few hours at least, is indispensable to the full development of the mental and physical powers and the perfection of harmonious proportions. It is necessary to sustain the strength and elasticity of muscular motion in manhood and maturer years. Instead of making a person stiff-jointed, it is the very thing to lubricate the joints. Instead of making a person awkward in movements, it subjects his muscles to the control of volition and enables him to govern their movements perfectly. Instead of destroying easy, natural motions, it legitimately produces them. Awkwardness of motion results from imperfect control of the muscles. This state of the system is produced mainly by two causes, first, *too much* muscular exertion, and secondly, *too little.* Plodding day-toilers illustrate the former, and sedentary and literary men and women, in general, the latter. It is by free and thorough exercise alone, that we acquire a full and easy control of the various muscles of voluntary motion, and thus become enabled to assume at pleasure those attitudes, and to perform with perfect ease those flexures and gestures which contribute to the perfect dignity and grace of man.

Hence, suitable unligatured *dress*, and free, active exercise, is as necessary for personal grace and dignity as it is for agility and strength; and it is doubtless more owing to the want of proper dress and muscular exercise than anything else, that so many students and literary men and women are actually more awkward and ungraceful than active, working people.

A suitable amount of exercise, and breathing of the pure air, to oxygenate the blood that feeds or sustains the brain, is indispensable to develop the full strength of the mind as well as the body. Our country has been fruitful in examples of the influence which early agricultural and mechanical pursuits have had in developing the mental powers and qualifying men for important enterprises and deeds of noble daring. Nothing has appeared to make the mind so acute, fruitful in expedients, decisive, persevering and firm in purpose, as these employments; and this has evidently been from the influence they have had in expanding and perfecting the physical and moral powers. Who for a moment doubts that it was the hardships, toil and emergencies of the times that brought out and developed the great men, and women too, of our American revolutions, and have produced a noble race who, under God, have achieved all we now enjoy which is valuable, of liberty, ability and excellence? History is richly embellished with their deeds of noble courage, endurance, and achievement, while the whole world has been awed into respect and inspired with admiration. Compare with these illustrious characters the miscalled gentlemen and ladies, idlers and dandies, whom ease and luxury, unaccompanied with labor and useful employment, are fast producing, and a sorrowful solace is derived from the picture.

The *practical*, healthy, harmonious men and women are the true dependence, the independence and glory of our country. Every man and woman is in duty bound to pursue a course of habits which all the young may in safety copy. All are also in duty bound to apply themselves to some producing business, which will not only benefit themselves mentally, morally and physically, but add essentially to the *mind*, moral worth, dignity and wealth of our nation; which is made up of individual knowledge, intelligence, industry and enterprise, mind and body fully and equally developed, made healthful and vigorous by well directed industrial pursuits, forming the only basis of individual and national goodness and greatness. As every muscle, bone and sinew grows strong with use, so of the various vital organs of the body, and of the brain and nervous system; but over use of either to the neglect of others, gives inharmony and deformities.

It is only in the *equal* intelligent development of all the faculties of body and mind that we become perfect human beings. Up to a certain age, the margin of manhood or womanhood, a great part of the energy of the vital functions is devoted to the direct nutrition and consolidation of the entire physical being. The tissues of brain, bone and muscle are soft and yielding, and are capable of being very much modified by external agencies. If a strain of unusual force be applied, the result is not usually, as in the adult, fatigue, which may be readily relieved by rest; but the tender organ yields, and its efficiency is often permanently impaired. Thus, the heart overexcited in a child by sudden alarm or fear, will become preternaturally dilated.

The bone on which undue pressure is exerted bends; the ligaments, often or too long stretched, yield and become relaxed. The brain being subject to precisely the same laws as other organs, as to nutrition, we find here also a fatal mistake in *overwork*, or entire *neglect* of mental use. Long continued exercise and neglect of sufficient sleep and horizontal posture (the brain is nourished most in that posture), will be attended, as in the adult, by rapid circulation and activity of the functions of the brain; but there is this difference, that the brain tissue here is soft and yielding, and instead of offering the normal resistance to the abnormal afflux of blood, it yields to the pressure, the vessels become enlarged, perhaps permanently, and severe alterations, if not congestion, is the result; productive not only of serious consequences for the time being, but by the very fact of its occurrence, inducing an ever increasing liability to the recurrence. Then, perhaps, the overcharged vesssels make an attempt to relieve themselves by pouring out some of their fluid contents, and effusion into the ventricles or on the surface of the brain is the consequence. It becomes obvious, from these considerations, what is the lesson which physiology would teach in reference to the consequences which may be predicted from intense application by the young.

These consequences will be still more marked and serious, if the *attention* be confined exclusively to *one* class of ideas; if one faculty be cultivated and urged forward to the exclusion or neglect of others.

Fatal disease is thus frequently induced, and where death does not ensue, idiocy, or at least such confusion of faculties follows, that the moral perception is obscured, and the sensitive child becomes a man or woman of hardened vice, or of insane self-will. The mind must be harmoniously developed and gradually inured to labor, and then, instead of a feeble or palsied condition, we may hope to become able to perform mental athletics to almost any extent without danger, and with ease and profit.

Let a person try a walk or horseback ride of ten or twelve hours in a day without training or having gradually increased the amount of exercise, and he will be most painfully reminded that organization has its laws, which cannot be violated with impunity. The brain tissue cannot be violated or expected to be more enduring or more tolerant of such liberties than the muscles. Let us but treat the brain as we would any other organ, and it will gradually grow strong and active. It is the most common mistake, in considering the mind as immaterial, to lose sight of this most important fact, that it acts always and exclusively through the medium of material tissue; which being, on the one hand, subject to an immaterial essence, does not, on the other, thereby lose its material organism, of which it is an important part. Poverty, anxiety, depressing passions and emotions generally the pre-existence of elements of degeneracy and disease in the organism, exert a most important influence upon the reaction of body and mind.

The *condition* and proper education of mothers, and their antenatal, as well as their *constant* influence over the human race, make it the the imperative duty of the physician to instruct women in the laws of maternity and hygiene; and I see no way by which the masses may be so easily or properly reached and improved, as by thoroughly educated, benevolent medical women.

Outlines of a Paper Entitled

A COURSE OF STUDIES ADAPTED TO HUMAN NECESSITIES AND TO HUMAN PURPOSES.

By Professor David H. Cruttenden, A. M.,
New York City.

Mr. Cruttenden commenced by defining teaching as a vocation, whose object is the development and the subsequent employment of human power. We must know what these powers are, how they are to be developed, and in what way they are to be used. A human being, according to the history of its origin, is a human spirit inhabiting a human body. "And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life, and man became a living soul." The spirit is the tenant, the body the tenement. The tenant occupies its tenement on certain conditions—we call them the necessities of life—and for certain purposes. Now, to fulfill these conditions, or to meet these necessities, and to accomplish the purposes for which a human being exists, knowledge is requisite. A part of this knowledge God gives. We call it instinct, mood or feeling, passion or emotion. These are perfect in themselves, and the means or language by which they are expressed, is also given in perfection. But there is another part of this knowledge which the human being may possess and may gain, but will never have unless he obtain it by an exercise of individual effort. We call this human intellection or intelligence. To no human being does God give intelligence; He gives the power to acquire and possess it only. "If thou be wise thou shalt be wise for thyself."

In the first place, then, let us see what that knowledge is which every human spirit must possess in order that, as a tenant, it may take the best possible care of its tenement, the body, or the knowledge which is necessary for physical culture. First, the spirit must take care that the body breathes, and that it breathes correctly; that is, it must attend to the quality of the air, to its quantity, and to the organs through which and into which it is taken. While in the country only about one in one hundred breathes corrrectly, in our cities the proportion is about one to three hundred, and the greater portion of these do so only through the training received from teachers of singing, elocution, etc. It does not follow that, because we breathe naturally, we breathe correctly. Now all training in the art of breathing should be accompanied by instruction in the science of breathing. The air, as the medium, and the organs of respiration, should be studied with the greatest care both objectively and subjectively. It is not the question how long vitality may cling to the body with low or suspended respiration, but what are those conditions of respiration which enable the spirit to use the body for the great purposes of existence.

Mr. Cruttenden also showed the necessity of acquired knowledge, in regard to nutrition, clothing, exercise as to their qualities, quantities, organs, etc., etc., and that the knowledge which the spirit must use in ministering to the necessities of life, is to be learned from what are called the natural sciences; as mechanics, chemistry, mineralogy, botany, physiology; not simply as these are taught in the schools, but as they may be learned in nature, and by daily use. These necessities belong to human beings, as individuals; there are others which belong to them as social beings, and constitute what is called our social or moral natures. This science is called mental or intellectual and moral science. It should be taught in connection with every circumstance arising in the family, or in the school, as a basis or as an illustration.

Finally, it is necessary that every human being should have a knowledge of himself as a creature, and, as such, of his relations to his Creator. This makes religious culture a necessity. Now a human spirit which has a knowledge of the necessities of its existence, and how to meet these necessities, has a grand foundation for the purposes of human existence; but this knowledge can neither be gained, retained, nor used without a knowledge of language; not word language, or language of feeling only, given by the Creator alike to mankind and to brutes, but a knowledge of thought language, given by the Creator to man alone, as the grand means by which he asserts and maintains his supremacy as lord of the creation. Without this thought language, man can neither think nor express his thoughts, can neither gain nor use knowledge, cannot become intelligent. Hence, the chief of human studies is thought language. The natural sciences furnish food for thought; language furnishes the medium in which the thinking is done, and through which the thoughts are expressed. This includes *language*, as the term is generally used, and also the mathematics, as a special use of language in expressing our knowledge of values and their relations. Every individual's knowledge of language must be based on his knowlege of the language which he daily uses, or his native tongue. If this be the English, he should study the structure of English words, of English phrases, and of English sentences, until he fully knows them and is familiar with them. This he should do, not only before he commences the study of any other language, but as the introduction to that study. The opinion is common that English can be studied only through the Latin and the Greek. Careful experiments have proved this to be an error. The English language contains every word, every phrase, and every sentential structure found in any or all the languages used by the human race. He who has mastered this, is able to master any other language in a fraction of the time now thought necessary, and, at the same time, to secure a more thorough and available knowledge of each and all of them. Mr. C. concluded by naming a course of study, comprised in the general statement; first, language; second, natural sciences; and third, the mathematics.

A MEMORIAL OF THE LATE MRS. EMMA WILLARD.

By Mrs. John H. Willard,
Principal of the Troy Female Seminary.

Since the last meeting of the Convocation, death has removed one of the great educators of the day, whose memory has a claim upon the attention of the University of the State, as the founder of one of the institutions under its direction. It is fitting, therefore, that it should utter a brief lament, pay a passing tribute of gratitude and reverence to the venerable founder of the existing system of education for the higher culture of women, Mrs. Emma Willard, and dwell for a moment upon what she was; upon the possibility of woman as shown in her life and character, especially upon her great educational services. For a voice comes from her fresh grave, impressing the lessons which have emanated from her noble character and lofty teachings, presenting anew the high ideal which she furnished her sex from which to mould their own womanhood.

And the wise rulers of this learned body may pause to hear of one who has influenced them through the lessons of truth and duty which their mothers received from her lips or her pen.

Providence made her an instrument in an important work, and endowed her for it richly in graces of heart and mind and person. She is to be honored for what she made of these gifts through her own instrumentality, and for the legacy she has bequeathed for the elevation of humanity. The example should be held up for emulation of so much toil, sacrifice and aspiration for the good of others; of faith in a holy inspiration, and of righteousness leading to a death of peace.

Mrs. Willard was a noble type and representative of her age and country. She came from the best puritan blood, was cradled in New England's early heroic days; moulded there in the style of the pioneers of the highest American civilization; nourished amid its hills to those stern virtues that gave dignity and grandeur to her character. In one of its quiet village homes, under the shadow of the church and school-house, she received her first grave lessons in spiritual and intellectual truth; at its fireside learned trust, obedience, endurance and energy; becoming thus possessed of the extraordinary moral power which was the most important element of her success in her great life-work.

In her youth New England had already rebelled against the rigor of those laws which prescribed to every man his mode of action, and was discussing the principles of right and wrong as applied to life and manner, and thinking profoundly and independently, and talking earnestly on abstruse religious and political subjects. Folly and frivolity found no place among those grave themes. Every man, woman and child waxed eloquent, at times, in the expression of solemn spiritual convictions. The new republic had just been purchased by the bold struggles of the revolutionary war; the fresh memories of all that it had cost, in suffering, in deeds of daring and in martyr's blood; and the inestimable value of the constitutional liberty it bestowed, thrilled the hearts and quickened the utterances of those zealous patriots.

Such influences, in early childhood, cultivated Mrs. Willard's superior natural gifts, developed the independence of thought and action, the intense patriotism, capability of metaphysical speculation, and rare conversational powers, which later on so eminently characterized her.

She was born Feb. 23, 1787, in Worthington parish of Berlin, Connecticut. Her father, Samuel Hart, was descended from Thomas Hooker, one of the founders of Connecticut. Her mother was Lydia Hinsdale, of a family of talents and moral worth. Her father was a man of marked ability, good early education, intellectual tastes and high moral excellence. He was prominent in church and State until the prevailing spirit of intolerance caused him to withdraw from office, in defense of truth and justice. He was the best educator of the mind of his daughter, while he read to his family and discussed with them the metaphysics of Locke and Berkeley, the poetry of Milton, Young and Thomson, histories, travels, and choice fiction; and of her heart, as he dispensed a generous hospitality in his simple way, and Christian benevolence in its most catholic sense.

The union of his manly strength and independence, with the practical, quiet energy of her gentle loving mother, in all the interests and pleasures of home, early led her to those ideas of the place and power of the sexes in the social economy, which she maintained in all her future influence. In distinct spheres, as she believes, each is useful and honorable.

Richly endowed and equipped by this intellectual and moral training, the brilliant young girl of seventeen, obeying an imperative impulse, entered upon her life-work by becoming preceptress of the Westfield academy. Her pupils were satisfied, their parents delighted, and other academies solicited her services; but she discovered that her common school education was insufficient for what she wished to do for her school, and, therefore, placed herself under the instruction of other teachers. For two successive winters she attended Dr. Miner's school. Late in life she wrote of him, "Dr. Thomas Miner, a graduate of Yale College, and once a tutor, afterward an eminent physician, president of the State Medical Society, and one of the most learned men of our country, awakened my powers, stimulated my mind, developed unexpected energies, and I believe that no better instruction was given to girls, in any school, at that time, in our country, than by Dr. Miner, as principal of the Berlin Academy." Her subjects of study with him were Webster's Grammar, Morse's Geography, and Composition.

These advantages and a few years of alternate teaching and attending the boarding-schools of Mrs. Royce and the Misses Patten, of Hartford, qualified her for a higher career. She accepted a call to an academy in Middlebury, Vermont. After two years, in 1812 the teacher was, for a short time, merged in the wife. It was when she came forth from this retirement, as the principal of a boarding-school for girls, in her own house, to relieve her husband, Dr. John Willard, from financial embarrassment, that she received the inspiration which kindled her naturally intense enthusiasm to a life-long effort for the elevation of woman.

Mrs. Willard's home was near Middlebury College. Its president and professors were her neighbors and friends; she became familiar with the improvement which the course of study produced upon the minds and character of the students, among whom, at that time, were Hon. Silas Wright, Rev. Nathan S. S. Beman, D. D., and John Willard, judge of the supreme court of this State; contrasted it with the effect of the light pursuits of young ladies in their schools, and resolved that, by God's help, she would secure for them equal advantages.

She had not means to pay large salaries to learned professors, nor could she tax fathers for their daughters, as would be necessary for those unwonted pursuits. Her only alternative was to fit herself for the office. For many years, she studied as she taught the higher intellectual subjects, algebra, geometry, mental philosophy, and others. To do this, she was compelled, frequently, to teach or study fourteen hours a day, and to use her vacations for preparation, until she had trained young ladies to assist her.

This experience so impressed her with the injustice of there being no endowed educational institutions for girls, while ample provision was made for their brothers to receive liberal education on moderate terms, that she determined to make an effort to obtain a State endowment for her school. It was an extraordinary movement for the time; especially as it involved the necessity of maturing a system of higher education and culture for women, adapted to their nature and duties, hence differing essentially from that pursued by young men; for, having resolved to appeal for legislative aid to carry out her advanced ideas of female education, they must be developed as the basis of action. Having prepared a "Plan of Female Education," as she styled it, at the request of the Governor, the Hon. De Witt Clinton, she submitted it, with an appeal for aid, to the Legislature of the State of New York, in 1819; removing her school from Vermont to this larger and wealthier State, to accomplish her object.

Her "plan" contained the system developed and ever since followed in the Troy Female Seminary, and adopted from it in all the higher institutions of learning for young ladies. Its distinctive and at that time peculiar feature, is the blending of a liberal course of scientific and philosophical training with the study of the elegant arts and accomplishments. She says in it: "Education should seek to bring its subjects to the perception of their moral, intellectual and physical nature, in order that they may be of the greatest possible use to themselves and others."

Three stages are to be observed in teaching a subject; the pupil must be made to understand, to remember, and to communicate it.

In originating such a system at that early day, Mrs. Willard displayed wonderful practical wisdom, sagacity and versatility. Failing to secure the endowment for which she applied, heroic exertions were necessary to raise her school to her ideal standard of excellence upon this comprehensive plan. To add to these efforts, she was compelled to write text-books adapted to her new modes of teaching.

It was thus, by almost incredible efforts, such as would have been impossible had she not possessed a grand physique, that she was able to bequeath to woman a legacy of priceless value. Even in her fruitless attempt to obtain Legislative aid, she secured advantages to her sex in this State; that application having led to the equal distribution between the sexes of the literature fund.

Mrs. Willard's text-books were geographies and histories with atlases, in series, arranged in geography for daily lessons in map-drawing in the lower grades, and in classified subjects for the higher; in history, for the periods into which she divided history; also, time-maps or chronographers, to assist the memory through the eye. She always employed the aid of the eye and classification in teaching.

The "Geography for Beginners" was published in 1822, the history of "The Republic of America, with Historical Atlas," in 1828. On every subject, she exercised her inventive, creative genius to illustrate it and make it interesting. She taught with the enthusiasm of an originator, thus enkindling the enthusiasm of her pupils.

Believing that the most important object of education is to give a knowledge of the instrument employed in the investigation and application of truth, and a skillful control of its powers, she made mental philosophy and mathematics prominent in the course of study.

She was an original as well as a deep thinker on many subjects. The friendship of Dr. Miner, her teacher, and his friend, Dr. Todd, and other eminent physicians of Connecticut, and her husband's profession, gave her opportunities to gratify an early taste for the study of physiology. The result of her physiological investigations was an original theory for the cause of the circulation of the blood; which was to her mind, and in the belief of many distinguished physicians who advocated it, a discovery. It had not then appeared in any American work on the subject, as it has since done. In 1839, she submitted, in manuscript, her theory of the motive power of circulation to many physicians in this country, some of whom adopted it at once; and she sent it to eminent physicians in Europe. She published it in 1846, in a volume, entitled "A Treatise on the Motive Powers which produce the Circulation of the Blood;" in which she gave experiments and reasonings to prove that respiration, operating by animal heat, produces an expansive power at the lungs, and thus becomes the principal efficient cause of the blood's circulation.

Her statement is, that "one of the motive powers of the circulation of the blood is heat evolved by the chemical changes which take place when air enters the lungs."

This was not mere speculation. She made practical important application of it to health, a subject that always claimed a large share of her attention.

But we should mistake if we supposed that Mrs. Willard's success and services were owing solely to what she did; it was even more by what she was, that she became a power in the country for the diffusion of the blessings of Christian education. And she did not become the queenly, model woman, who ruled the hearts and minds of the multitudes, without unceasing industry, and indomitable will and energy in improving the circumstances in which she was placed. Her superior natural powers, and early noble traits of character were developed under the most favorable circumstances. She was fortunate in the period in which she lived. While she conferred great blessings, her age and contemporaries had a powerful reflex influence upon her. We say of the great men of her time, "there were giants in those days;" and when they passed away, "how shall the ship of State be safely guided without their wise counsels." In consequence of her efforts for self-culture, she was able to enjoy the society and correspondence of those illustrious men. Her intelligence and extraordinary conversational powers commanded the attention of the highest and brightest intellects; and this brilliant social intercourse did more than mere study to form the lofty tone of mind which made her a distinguished woman.

The refinement and elegance of her tastes was owing, in some degree, to the same cause, but more, perhaps, to her inherent love of the beautiful. The beautiful in nature, art, music and poetry ever found a response in her soul. A touching song fascinated her. No tint of the changeful sky, no glowing sunset, no beauty in the spreading landscape, no unfolding flower, no melody of singing birds, was unheeded by her watchful sense. To her, "a thing of beauty was a joy for ever." She cultivated her rare personal beauty as she would make a picture beautiful, and used her dignified, majestic mein as an influence for the good of others; an influence for which she felt responsibility. Possessing a poetical temperament, she employed her gift of poetry to lift the heart in holy faith and hope, in prayer and praise, to the infinite source of strength and love; whether on the stormy ocean, in her country's peril, or to win a young girl's affections from the fascinations of this mortal life, to lead them to the life eternal.

Imagination was the faculty which enabled her to be original, by suggesting the new relations and combinations which she employed in new and interesting modes of teaching. She exercised it, also, in the mingling of the æsthetic and useful, to give refinement to the useful and ordinary. The ideal perfection that this power of the mind requires was the cause of the elegance she gave to every exercise, even on the commonest subject. By having everything done with grace that must be done, she made her pupils ladies while she was making them scholars. Stimulating them by the holy motive of satisfying the Divine Author in the use of their gifts and opportunities, she led them at the same time to the consecration of their attainments to a Christian life.

The various powers of her comprehensive mind, the versatility of her genius, the rich glow of her enthusiasm and the breadth of her culture, all contributed their share to the successful development of her grand ideas of female education, so remarkable when she advanced them fifty-six years ago, now, through her instrumentality the heritage of every girl who has the means to command them.

Mrs. Willard failed to realize her primal idea of endowed institutions for women, because the age was not sufficiently enlightened; but she prepared the way for them, by showing that young ladies are capable of learning those intellectual subjects which discipline their minds, train their reasoning powers, strengthen and elevate their characters, and make them more permanently attractive than when educated by light and trivial studies.

The system of uniting the solid and æsthetic, as necessary to a thorough mastery of either was established; future intelligence will make the advantages of it general, by generous endowments of institutions for the education of women. The beginning already appears.

But it was because Mrs. Willard was the best as well as the greatest of women that she was successful in her noble work. It was because her large, warm heart extended the advantages, which she had worked out in her school, to gifted young ladies, who aspired to the higher culture it afforded without possessing means to command it. These grateful, ambitious girls rose to the foremost rank in scholarly attainment, and disseminated the knowledge they acquired, by planting schools upon the new system in every State of the Union. And there were treasures of love laid up in their hearts, impelling them to sustain her in the unusual efforts which she sometimes found necessary.

After she had retired from the seminary, her all embracing interest in humanity, and profound conviction that education is the true means of elevating or saving it, induced her to engage in the improvement of the common schools of her native State, in Kensington, Connecticut; as she had, during her administration of it, been the means of establishing a normal school for native teachers in Greece, for the improvement of the women of the east. She submitted to Bolivar a course of instruction adapted to the new Republic of Columbia.

These noble public services were allied to generous private charities and beneficent plans for the amelioration of the humbler classes; the suffering poor, and the wives and children of brave soldiers who had given themselves to the defense of the imperiled country. The wounded heart never applied in vain to her for sympathy; the trembling school girl, the unfortunate friend, the lowly and the penitent erring woman, all found encouragement in her tenderness, or assistance in her words of affection and godly counsel, in her labors of love and mercy. Ever true-hearted and forgiving, friendship was sacred to her for life, and looked to as a happiness in the higher future life.

She was eminent as a patriotic citizen. Her country was next to her God in her affections. Her active brain was always grappling with some problem to be solved for its benefit, and many a scheme was wrought out and presented to her friends in public life. Only when she feared for the existence of the Union, did she rush to its defense as a champion of peace. Women, she believed, best served their country in their private capacity, by making the family the nursery of the State, in all virtue and godliness; that "righteousness saveth a nation," and that woman controls this moral power. Hence, the formation of religious character was her highest educational aspiration.

This illustrious woman had lived for the spiritual well-being of her sex. She was not permitted to enter into rest and glory until she could leave an example of a life completed in all its stages; until she had shown the beauty of a serene old age. The burden of life laid aside, its spiritual conflicts over, she was called upon to glorify her Lord by waiting for the summons to go with Him to the celestial mansion, which long before He had assured her spirit that He had prepared for her. Her great soul was fettered by the infirm body being unable longer to obey its behests; yet, in a cheerful "hope full of immortality," "she did what she could," until cleansed by penitence and prayer from earthly dross, refined and purified by the chastening of faithful love, gently and kindly, by a short and easy passage, soothed and strengthened by the fullness of divine consolations, she was taken to "the better land."

She rests from her labors, and her works do follow her. Did not Providence appoint her to her great work? May He not say of her, "even for this purpose have I raised thee up, that I might show my power in thee, and that my name might be declared."

The grand labors of her remarkable life are concluded; the glorious cause for which she lived is committed to the women of the present and future. Let them aspire to bear it on to its highest destiny, to obtain the blessings of a lofty Christian education for all for whom they have been purchased with toil and sacrifice, and to commit them to the women of all the future generations. Then will the splendor of their inheritance be increased and magnified, until woman has won all the rights and privileges which education can send to her, and be satisfied. Then will she fulfill the high and holy trust that rests upon her. Then will blessed memories of Mrs. Willard bring forth fruits of life and immortality.

LIST OF PUBLICATIONS BY MRS. EMMA WILLARD.

"Plan for improving Female Education," addressed as a Memorial to the Legislature of New York, 1818.

The Woodbridge and Willard Geographies and Atlases, comprising a "Universal Geography and Atlas," a "School Geography and Atlas," an "Ancient Geography and Atlas," "Geography for Beginners and Atlas." 1822.

"History of the United States, or Republic of America," with Atlas. 1828. Brought down in 1852 and 1867.

"Journal and Letters from Europe." 1833.

"Universal History in Perspective." 1837.

"Abridgment of American History." 1843.

"Temple of Time," or Chronographic Universal History. 1844.

"A Chronographer of English History." 1845.

"A Chronographer of Ancient History." 1845.

Historic Guide, to accompany the Temple of Time, and other charts.

"A Treatise on the Motive Powers which Produce the Circulation of the Blood." 1846.

"Respiration and its Effects." 1849.

"Astronomy." 1853.

"Morals for the Young." 1857.

Besides these larger works, three Addresses on Female Education in Greece.

REPORT ON ACADEMIC EXAMINATIONS.

The committee to whom was referred the subject of Academic Examinations, would respectfully report:

The method of conducting examinations of classes in our academies and higher institutions, presents a problem which has probably occupied the thoughts and taxed the ingenuity of most persons that have ever at all engaged in them. The two simplest methods are, the *one*, purely oral questions, proposed by the teacher and answered *viva voce* and *extempore* by the pupil; and the *other* consists of written answers to questions, a few in number, proposed, the same to each and all the students.

Each of these methods has advantages and disadvantages of its own, which are already sufficiently familiar to all to render any enumeration or recapitulation of them here unnecessary. Some students can make a much better display with off-hand, oral answers; others, with no better knowledge of the subject, can do much better with pen or pencil; writing out such thoughts as the questions proposed may call for.

When the classes are small, a combination of these two methods has been found practicable and accompanied with very good results. A series of questions, ten or a dozen perhaps, would be proposed to all the members of the class alike, who, seated at convenient or sometimes rather *inconvenient*, distances from each other, would be engaged in writing their answers; the teacher, meanwhile, seated at his table, would call the students each in turn, and one at a time, to him and give them an oral examination, while the rest would be diligently engaged in writing their answers. This plan seems to secure all the advantages of both of the two simple methods of which it is composed. But it has some disadvantages of its own which do not attend either of the two when used separately; the opportunity for fraud is doubtless somewhat increased; the method is very laborious for the teacher who is engaged in conducting the examination, and is altogether impracticable when the class is very large.

A fourth method that has been practiced with success, and has some peculiar advantages, consists in preparing beforehand a series of examination cards, no two of which are alike or contain any question in common. These cards may be in numbers equal to the number of pupils in the class, or what is far better, twice or three or even four times that number. The pupils, on entering the examination room, each draw by lot a card, the cards being numbered in order, and retires to his seat and occupies his time for a while in recalling his knowledge of the subjects suggested by the questions on his card, and then they begin in the order of the number of the cards, each to answer the questions, after having read them aloud to the class, orally, and of course receiving such corrections and answering such additional questions pertaining to the general subject of his written questions, as the teacher may see fit to propose.

There are several manifest advantages of this method. (1.) It gives each student time for recollection and preparation, without of course recourse to his books, notes, etc., or consultation with others. (2.) It secures a complete review of all that the class has gone over, and may thus be made a pretty minute review of the work of the course, and do a great deal toward giving to it completeness and symmetry, and fixing it in the memory of the student. (3.) It gives the teacher an opportunity to make correction of the misapprehensions into which the class may have fallen, if any there should prove to be; to supplement, if need should require, such defects and omissions as haste or other causes may have occasioned. (4.) And finally, it affords all the advantages of a simple oral examination, and is, we think, less liable to abuse and fraud than the ordinary method of written examinations and answers to questions proposed, the same to each student.

This method, however, is impracticable where the class is very large, unless we should consent to take more time than a mere examination is generally thought to deserve; and, for the same reason, a simple oral examination, consisting of answers to questions orally and extemporaneously proposed, can amount to scarcely, if at all, more than a mere form. Neither of these methods will allow each pupil time to give any satisfactory indication of his proficiency and thoroughness in his studies; and, often it will happen, that in either of these methods, the most thorough and profound student will make but a very unsatisfactory appearance under the circumstances of such an examination. Hence, as we believe, the only method in general use, when classes are large, is the second one named at the head of this report, usually a series of questions, either printed beforehand or dictated to the class at the time of their examination, and written down by them, each one for himself. And in case the class is large, consisting of fifty students up (as in some cases it may) to three or four hundred, it is found necessary to have them distributed into several rooms, and to have several persons engaged in giving out the questions and superintending the writing of the answers; the answers themselves being handed over to the teacher or teachers in the department for examination.

It would undoubtedly be better to have an examining committee, consisting of the same persons to hear the answers and examine the papers that are handed in, in case the examinations are in writing. And it is best, too, to have for these examiners, person who are not connected with the ordinary corps of instructors, whenever such an arrangement is possible. It gives thoroughness to the examination, proclaims and advertises the excellences of scholarship when such excellencies exist; and exposes defects of whatever kind when there are such defects to be exposed; and the exposure of them is, as we know, in this country, one of the surest and most indispensable means to their remedy.

But in the present state of our country, the difficulties of getting competent examiners from outside of the academy or college is very great, perhaps insurmountable. The number of persons who, in the present state of our scholarship, are capable of doing anything more than sitting by and *looking wise*, when an examination is going on, is very small, except in a few of our larger cities. This difficulty, however, has about the same relation to one method of conducting examinations, as to another. Nor do we know that it is a greater obstacle in the way of the success of any one of them than of the rest that we have just named.

Your committee proceed, however, to speak of still another method of conducting examinations; the one for which this paper has chiefly been prepared. The method we are about to present for your consideration has been in use for several terms, and has been pretty thoroughly tested and with most satisfactory results. The questions are prepared as follows:

First, make a synopsis or syllabus of the entire course of lectures or instruction, making a question for each separate fact or principle that is of sufficient importance or prominence to deserve so much attention.

In the *next* place decide how many sets of questions or different cards it is desirable to have. The number may vary within pretty broad limits, and is not important. It is *next* important to decide how many of the questions you will have on each card. Suppose, for the sake of illustration, that there are to be twenty sets of questions; one set on each card, and five questions in a set or card. Begin by writing the first question on the first card, the second on the second, and so on, until one question has been written on each card, then go over the cards again in the same order, with a second question on each card, so arranged that the questions themselves shall be consecutive; that is, the second question on the first card shall be the next in the natural order of subjects after the first on the last card; the third on the first card be the next after the second on the last, and so on, until all the questions are disposed of. Let these cards or sets of questions be printed some days or weeks before the time of examination, and distributed among the students, to aid them in preparing for the examination.

At the time of examination the students present themselves, and each one *selects his card by lot.* It would be well to have the classes come to the examination in sections, one section at a time, and the sections about as large as the number of examination cards, so that each of those present at a time would have a different set of questions. This arrangement would enable us to give the students each one his choice between a written and an oral examination; or to combine both, if that were found advisable.

Among the advantages of this method the one that has seemed to be the best and most desirable of all, is this. It secures a more thorough review and reading up, preparatory to the examination, than any other that we know of. No student knows or can by any possibility guess which set of questions he will be called upon to answer until he is in the room, and after all opportunity for special preparation on his special card is past. But he knows for days perhaps weeks, beforehand, what questions will be asked and all that will be asked. He has, therefore, a guide to his review and reading, so that he may know precisely what to read up and prepare upon. And the questions, if they are judiciously proposed, in the manner just described, will suggest the points to be looked into, and the looking into which will call for and necessitate a thorough review of the whole subject. It will, moreover, do a great deal to individualize and give due prominence to what are really the most important points, facts and principles, of the science we have been teaching the class.

By the distribution of the questions in the manner already indicated, some days or weeks before examination, each student will have one leading and important question in each of the parts or subdivisions of the general subject of the course of lectures on which he is to be examined. He must, therefore, not only read up on the whole course to be prepared to pass his examination, but he must have mastered the whole and all parts alike to pass an examination of the highest excellence. If he has unfortunately been absent, from sickness or other cause for any part of the time, the defect will show itself in the answers he will be prepared to give; and, on the other hand, he will have an opportunity to do himself full justice on those parts, which he had the means of pursuing with the class.

After all, it is more than probable that no one method of conducting examinations will ever be found to be of universal application. Difference in circumstances, and, more than all, differences in the habits and peculiarities of teachers themselves, will doubtless ever remain a sufficient cause for the preference and use of different methods. We have, therefore, aimed in this report only to present one more, which affords some peculiar advantages of its own, and which, therefore, may contribute something toward the furthering of the cause for the promotion of which all are designed.

We submit, as a part of this report, a sample, as a specimen of such an examination paper as we have described. In this case, circumstances, which we need not here mention, compelled the professor to make but ten sets of questions or cards, whereas, as a general thing, we should prefer at least twenty or thirty, in order to give the method its fullest and fairest opportunity to display its excellent points.

We regret that we have but the one paper, and have no specimen of other papers to exhibit to the members of the convocation.

It will be observed that if the questions are read in the following order, namely; the first question on the first card first, then the first on the second, and so on to the last; then, beginning again, read the second on the first card, then the second on the second, and so on to the last question on the last card, we have a complete syllabus of the lectures in the order in which they were delivered.

For the committee,

W. D. WILSON,
Chairman.

QUESTIONS ON THE COURSE OF LECTURES IN LOGIC, DELIVERED BY PROF. W. D. WILSON, BEFORE THE JUNIOR CLASS IN CORNELL UNIVERSITY, SPRING TERM, 1869–70.

No. 1.

1. What is logic? What is its relation to psychology?

2. What parts of speech may be used as predicates, and under what circumstances?

3. When is a syllogism called "categorical?" On which of the four relations of things does it depend?

4. What is a comparative syllogism? Explain the reasoning in, A is greater than B; B is greater than C, *therefore*, A is greater than C.

5. State the relation of language to reasoning? What is the use of nouns? What that of other parts of speech in the logic of language?

6. What fallacies are extra logical? Why are they so called? Name and explain some of them?

No. 2.

1. Explain the several acts between observation and judgment—analysis, abstraction, generalization.

2. Explain the four kinds of propositions — universal affirmative, universal negative, partial affirmative and partial negative.

3. Explain the *dictum*, "Whatever may be affirmed or denied of a class, may be affirmed or denied accordingly of whatever is contained in that class," and show to which of the four figures it applies.

4. In case the major premises is a ratio, as 3 : 4 : : 6 : 8, how would you complete the reasoning? Give examples of this kind of reasoning.

5. State and explain the three rules for the intelligibility of sentences, (1) when the copula is, "is," (2) when the verb is active, (3) when it is transitive.

6. What is an *individual* proposition? How may it be proved? On what does testimony ultimately rest? What are the conditions that determine its value?

No. 3.

1. Explain the difference between physical and logical analysis. How do the terms obtained by the processes differ?

2. Explain the relation of individual, species and genus, in classification.

3. Explain the *dictum*, "When an attribute is affirmed of one object or class, and denied of another, the two may be denied of each other," and show to which of the four figures it applies.

4. What is analogy ? and what its logical force ?

5. In case an abstract term is used by metonomy, how will you find its logical equivalent ?

6. What is a *general* proposition ? How can one be proved ? What is the difference between "matters of fact" and "matters of opinion ?"

No. 4.

1. What are the three parts of a proposition ? Show that all propositions can be reduced to the form S is P.

2. What are the conditions of a logical division ? What are co-ordinate and what alternate parts ?

3. Explain the *dictum*, "If any two classes are predicated of the same object, they may be predicated partially of each other," and show its application.

4. Explain the relation of cause and effect, and state the difference between a *logical* and a *physical* cause.

5. What is a fallacy ? When is it said to be "in form," and when "in diction ?" What is necessary to detect a fallacy in diction ?

6. How does a *universal* differ from a general proposition ? In how many ways can a universal proposition be proved ? What are they ?

No. 5.

1. What do we mean by a genus ? a species ? an individual ? What terms are first in the order, individual, general, or specific terms ?

2. Explain the relation of the four propositions, A, E, I and O, by reference to classification, and show what relation each of them implies between the terms of which they are composed.

3. What is the fourth figure, and how would you treat the syllogisms in that figure ?

4. If we have the conditional Major Premises, If A is B, A is C, in how many ways may you complete the syllogism ? What ways would be invalid ?

5. Define the six kinds of fallacy in Diction, Figurative Speech, Many Assertions, Ambiguous Middle, Variation or *non tale*, Ambiguous Middle, Division and Composition, Substance and Accidents.

6. What are some of the arguments that only create a probability ? What is the nature of the argument of "Progressive Approach ?"

No. 6.

1. Explain the division of properties into "Essentia," "Differentia," "Inseparable Accidents," and "Separable Accidents," and explain each of these terms. Are the *Essentia* always *essential* properties?

2. When is a term said to be "distributed" in a proposition? What propositions distribute the subject? What the predicate?

3. Explain the syllogism "My hand touches the pen, the pen touches the paper, *therefore*, my hand touches the paper," as a fallacy of many terms? State the Rule?

4. Regarding "If A is B, A is C," as an Enthymene, how may you find the assumed Sequence or connection between the Antecedent and the Consequent?

5. When the same term occurs as the middle term in both premises, how do we know that there is a fallacy in diction?

6. What is transcendental Logic? On what fundamental facts and principles does it depend? and what may we expect to accomplish by it?

No. 7.

1. What is analytical reasoning? What synthetical? Why are they called respectively *a priori* and *a posteriori?*

2. What inferences may be drawn from the "opposition" of propositions, (1) subordinate, (2) contrary, (3) contradictory, (4) subcontrary?

3. Why can there be no conclusion if there are two negative premises? State the rule for fallacy of negative premises.

4. State the fourth of the relations of things out of which syllogisms can arise—parts to whole. What are the laws of division in relation to it?

5. Explain and name the fallacy in the following: "Money will buy whatever is for sale; a two-shilling piece is money, therefore a two-shilling piece will buy whatever is for sale."

6. Name and describe the fallacies in matter. (1) Non vera pro verâ, (2) non causâ pro causâ, (3) metabasis, (4) no sequence, (5) non-excluded middle.

No. 8.

1. What is a verbal definition? What a real definition?

2. What is the contraposition of propositions? How may E and O be stated as affirmative? A as negative?

3. What is undistributed middle? Show the fallacy in "Dogs are quadrupeds; spaniels are quadrupeds; therefore spaniels are dogs."

4. With the disjunctive either A is B or A is C, what are B and C to each other? and how may you complete the syllogism?

5. Explain and name the fallacy in the following: "The Romans conquered Carthage; Cicero was a Roman; therefore Cicero conquered Carthage."

6. What is reasoning in a circle? How far do we hold a man's logic responsible for the truth of his premises?

No. 9.

1. Explain the principle of identity and contradiction, and its application to *a priori* propositions.

2. What is the conversion of propositions? How may E and I be converted? how A? how O?

3. Show the fallacy in "Negroes are black, Bedouins are not Negroes, therefore Bedouins are not black." What is illicit process?

4. What is "excluded middle," and how can you find it from the proposition either A is B, or A is C?

5. Explain the difference between a "general" and a "collective," term and how will you distinguish them in a proposition?

6. Explain the difference between the refutation of a man's reasoning, and the refutation of his conclusions, and the effect of each respectively.

No. 10.

1. What are the four relations of things on which reasoning depends? Explain *Quality*, *Quantity*, *Causation*, *Totality*.

2. Put the proposition "None but whites are civilized" into its simplest forms.

3. Explain induction. On what general principle does it depend for its certainty?

4. What is a cummulative argument, and how would you estimate or compute its force?

5. Explain and name the fallacy in the following: "Whoever calls you a man speaks the truth; but he that calls you a liar calls you a man; *therefore* he that calls you a liar speaks the truth." What is the fallacy of "Substance and Accidents?"

6. What is the nature of an *Axiom* and what that of a *Maxim*, and how will you test the truth of each?

TEACHERS, TEXT-BOOKS, AND THE ENCOURAGEMENT OF PRACTICAL TEACHING.

BY MRS. CAROLINE P. ACHILLES,
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It is due this intelligent audience, that we first announce, by way of explanation for assuming this privilege, that it is the writer's only desire to invite investigation or discussion, and, possibly, some action on the following queries relative to teachers, text-books, and the encouragement of thorough practical teaching.

For, should we not deem it absurd to send a Mozart as minister to the court of St. James, or to place an Agassiz in old Trinity or Plymouth pulpit? As well might we do this, as to employ in our public schools or academies, our seminaries and colleges, many of the teachers who attempt to do or accomplish just what nature and habit least qualified them for. Is not the number "legion" thus employed, without reference to any natural taste or ability for the vocation; and who are, indeed, destitute of native energy to try to overcome these barriers to ultimate success in their calling, the position being sought either from fancied necessity or political preferment? Few, surely, can be so ignorant of the true teacher's position as to enter the arena for its pecuniary emolument. Multitudes seek or are recommended for the vocation, temporarily, who have no love for the labor, no enthusiasm, not even a distinct utterance or enunciation, a quick perception, firm or elastic step, or, an energetic movement that would indicate to the most casual, clear-headed observer a single faculty naturally adapted to the profession.

Such, we are sorry to say, is the rule rather than the exception among the masses of teachers, recommended either from blind partiality, or upon the principle of reciprocity, and with no possible estimate of the injustice done in this way, both to the ill-adapted teacher and the unfortunate pupil taught, and, through these, to the intellectual and moral world at large.

We insist that no teacher can do his or her full duty without a realizing sense of the responsibility assumed, nor without the dignity of self-control, with a self-sacrificing (literally a missionary's) spirit, and aim for the highest good to the taught. Now, how remedy the above evil? Shall it be left only with the employed or the indiscriminating (not to say mercenary) employer, and those who dare thus recommend and trifle with the best interests of the rising and future generations; saying nothing of our State provisions, whose very liberality, without ample conditions of aptitude for teaching, unintentionally invites the intellectual preparation of this promiscuous mass of mind, and to seek, for a brief term of years, this ill advised field of almost sacred labor, which has thus far been left open alike to the mechanical artizan, the farmer, the politician or the orator, legal or clerical. What should we think of either of the latter entering upon his legal or clerical profession only temporarily, as a stepping stone to "something better and higher?"

Only one remove from the last of these, is the moral and intellectual responsibility of even the lowest grade of teaching. Hence, the importance of recommending only those who feel this responsibility and as are, to all appearances, endowed by nature with the faculty to teach and to influence the mind for good. Only such should be encouraged to prepare for and enter upon the vocation. It may be questioned, what shall the "ninety and nine," or nineteen-twentieths do then? Let them study and prepare equally for just what they have the natural talent to perform *well* or best. Our beneficent Father has not bestowed his gifts so unwisely that we are all equally endowed with the same talents and for the same vocation.

We need, and must have, teachers who love the work; who enjoy teaching and explaining a point or a proposition, seventy times seven, if necessary, to arouse or impress the mind of a dull scholar; who should be the especial favorite (to all appearance), as the medium through which all his quicker class-mates are involuntarily instructed, and made thorough in the lesson thus inculcated. Such a teacher dreads not the hour of school, nor deems it drudgery to spend his or her leisure time in looking over the lessons of the day, however familiar, to find some new idea, or new mode in which to present the old one, in order the better to interest or fix the same in the minds of the taught. For the earnest teacher, next to the mother, moulds the mind of the future man.

But are not our popular text-books a hindrance or perplexity in this daily preparation for the faithful teacher's work? Many of these come under the same ban as do the objectional class of temporary "professional teachers." Too many of the latter, in their mercenary desire for a trifling pecuniary gain, will condescend to encourage the use or introduction into their schools of any new school book on which they can, personally, realize a paltry profit; which the host of poor, despised book agents are continually offering at any stipulation that will insure the introduction and sale of the new work—each, possibly, poorer than its predecessor—and all at the ultimate expense of the poor pupil or parent who, of course, is anxious for any improvement represented as "saving time and labor;" in other words, as a sort of brain-saving machine, which, in reality, only befogs the mind of the young student (and we have, comparatively, few others in this fast age), like the later so-called intermediate and practical arithmetics of the day. And, just here, permit us to inquire whether this erudite and honorable body will not devise some plan to secure an entirely new compilation of mathematics, simpler in detail, and condensed in number, grade and form; or, command us to return to our old, world-renowned, Davies' series, so much simpler, because free from the senseless "puzzles" of our later authors, who are equally objectional with his in the multiplication of divisions or books in each series. At least, can we not have *one* new arithmetic, sensibly comprizing, in one common sized school book, all above the "mental" exercises (adapted to the capacities of children of ten years), that is necessary for the practical business masses, and for the pupil's preparation for the study of algebra, which in turn may be so arranged as to embody in one work all that is essential in the higher algebra for the study of geometry, and all higher geometric and practical astronomic calculations?

Such a compilation or improvement would save this multiplicity of books in the same series, and, if recommended by this august body, would result in avoiding the change of text-books with every change of principal or new book agent sent out to recommend promiscuous publications; also, in saving the time of the faithful, practical teacher, taken to examine, select or reject, as heretofore, in order to avoid, if possible, a new imposition upon their earnest students least able to bear the loss of time consequent upon change, or in going through each grade of a series, vainly professing to have been "elucidated equally for the benefit of public schools, academies and colleges."

In the natural sciences we have been more fortunate, excepting in our multitudinous geographical series, needing our physical geography treated simply and separately.

Our French, German, and other lingual text-books, like the classical, are nearly as varied as the teachers or publishers selling them.

The evil in these is less felt, because there are fewer pupils pursuing these studies for aught except the discipline of long continued, consecutive thought; which habit or discipline many acquire, in far less time, from a thorough, mathematical course. Hence, the hoped for reform (or its benefits), from a reduction of the number embracing such course, and the simpler mode of teaching the same, whereby instructors would be encouraged to depend less upon text-books for the instruction given their pupils.

But the greatest encouragement the faithful teacher can have, is the evident improvement of those committed to his or her care or instruction. Next to this, would be the evident appreciation of their fidelity to their calling, evinced by a united resolve of our presidents, professors, principals, school commissioners and superintendents, to recommend none, nor to certify to the competency of any one, who has not the natural and acquired elements of a thorough education.

Then, too, we might look in our lower grades of schools, as in our higher institutions, for a corresponding increase of energy, improvement and intelligent success. As remarked to us by a former pupil and fellow-traveler, while visiting the Swiss schools and seminaries in Geneva: "The *secret* of their excellence lies in the independent frankness of the people, who fearlessly commend or condemn their teachers, just according to their merits."

OUR NORMAL SCHOOLS AND THE STUDY OF THE CLASSICS IN THE SAME.

BY NORMAN F. WRIGHT, A. M.,
Professor of Ancient Languages in the Cortland Normal School.

The people of the several localities in which our State Normal Schools are situated, in furnishing grounds, buildings, furniture, apparatus, etc., have shown commendable zeal toward the project of introducing more normal schools into the State; but whatever these localities may have contributed, becomes a mere pittance in comparison with what the State has to do in sustaining the same, after fairly in operation.

The Empire State deals out in no stinted measure the necessary means for successfully prosecuting the work of preparing teachers for the responsible business of instructing the rising generation. Reckoning the two normal schools already located at Buffalo and Geneseo as receiving the same amount with the others, the State is paying out of her treasury, annually, for these schools, not less than $150,000.

To make the whole a fair business transaction between parties, we must regard the State as a common parent of the men and women in her borders, and deal as honestly with her, as a parent, as she is generous in contributing for the improvement of her children. How then can the State be best compensated for her munificence in behalf of her normal schools? As we look to the fruits of any enterprise to calculate its value, evidently such compensation will consist in the number and quality of teachers furnished the State yearly.

In 1844, the Normal School in this city (Albany) went into operation, being among the first institutions of the kind established in the United States. In 1862, the number of graduates was fifty-four; the number admitted during the year, one hundred and ninety. At a given period of the school's progress, 1,313 pupils had completed their course, while 3,854 had attended partial courses. Judging from the alacrity with which these schools are filled up, we calculate that the normal schools last established will meet with as generous patronage from the public, as those first commenced at Albany and Oswego. Using the above figures as a fair average, we come to the conclusion that after the eight normal schools of the State are in successful operation, not less than four hundred pupils will graduate yearly, giving an average of fifty to each school. We also find from the figures above, that about one-fourth of the whole complete the course and take diplomas, while the other three-fourths attend partial courses. But how much importance shall we attach to the three-fourths who never take diplomas? In my opinion, in the aggregate of teachers' labor for the State, they will fully make up for the loss of those who, although receiving their full course, yet, from various causes, never enter upon the profession of teaching.

Taking then the probable number four hundred teachers yearly, as graduates from our eight normal schools, and the cost to the State is $375 per scholar. In a business point of view, we ask, will it pay to make this outlay for the encouragement of this number of young men and women to enter the profession of teaching, together with the increased facilities that these schools may afford for perfecting the art of teaching? We answer in the affirmative, and believe that the State makes a splendid investment when she lays out $150,000 annually and receives in return four hundred first class teachers.

But there are ways in which the object of the State may be subverted, to a few of which I will allude.

In the first place, a lack of sagacity and discrimination to secure the best possible materials, or indiscriminately bestowing the gratuities of the State upon those who are devoid of talents indispensable to success in the art of teaching, will in not a very long time induce that depreciation which would soon lead the State to question the propriety of her investment in this direction. When Cicero was asked how far training had to do in making men great, he replied, that nature without training is more influential than training without nature. In the choice of materials, nature's gift is superior to training, but if both of these are united in the same person, we may be assured that something useful can be brought out, even when applied to the art of teaching.

Let us scan for a moment the material which is to be wrought into normal graduates. The invitation goes forth, reaching mountain top, hill side and valley, for the young men and women to come to our normal schools. The inducements are, *that whereas* you have moved in a narrow sphere, and your influence been unduly circumscribed, you can in a few months be prepared to become a head center, with forty or fifty luminaries moving about you, dependent upon you for light and motion ; *that whereas* you have been accustomed to receive a compensation of from $200 to $300 per annum, by a few months preparation you can double or triple this amount for yourselves. The result is that our normal schools are filled up, to say the least, with a miscellaneous, and, in some respects, crude material, ranking about as we find in our first-class academies in quality, in age somewhat higher. One may readily perceive that, under these circumstances, the net having been thrown out and all kinds gathered, much sagacity and wisdom are necessary to sit down and "gather the good into vessels and cast the bad away." Again, the lawful custodians of the educational interests of the State, seeing such an amount pass yearly from the State treasury, and being solicitous that results from this outgo should be realized at the earliest possible period, out of pure devotion to the State may urge the adoption of a curriculum too limited for proper culture and training. Again, it is plausibly said by one, beware how you too highly educate your normal teachers, lest in that event they either leave the State for places offering higher salaries, or place too high an estimate upon their services to labor in the rural districts of the State. As to those who leave the State and those who never teach the value of two years after receiving a diploma, it appears reasonable that the State should guard itself against the sharp practice of such teachers, by requiring them to refund part pay, say $200, to the State, that abuses may not be practiced by those who receive gratuities, but in no way answer the demand for which the gratuity is made.

But where are the graduates from these normal schools to be found after graduation ; say nine-tenths of those who enter upon teaching and remain in the State ? Not in the common rural districts, but in the prominent public schools and seminaries of the State. Some are called directly to take positions in the normal schools, others to the large city schools, and others to take charge of the chief departments in the union schools of the State. Seldom is one found in a common district school, unless it be for a winter, in places where the wages are from ten to twelve dollars per week. If the demand is so great for normal graduates, to fill important centers of influence, in order to instruct others that they may go out into the smaller districts, then the obligation becomes doubly strong that every teacher sent out from these schools be fully prepared for this work. We have proceeded on the assumption that the State is a party concerned, and would exercise as much judgment and discretion in expending her funds as would the guardian of a family. If a parent wishes his son to pursue one of the professions, he first gives him a collegiate course of instruction of four years; after this, a three year's course bearing upon his profession.

We take the circular issued for the normal schools and find that three courses are marked out, viz., an elementary, an advanced English, and a classical course. The first two courses are for two years each, and the classical for three. Forty weeks constitute a school year. Here, then, for the first two courses are assigned eighty weeks each, and for the classical one hundred and twenty, in which to acquire information upon the subjects to be taught, and at the same time to perfect themselves in the theory and art of teaching. The young man whose aim is a profession, spends four years for general culture; leaving his profession, comparatively, out of sight, until he enters upon his professional studies. This gives the young man depth and breadth. He possesses a subsoil to his mind, every part of which is filled with some one of the arts of liberal culture. This common stock supplies ample resources when he enters upon business life. His knowledge of poetry, eloquence, philosophy, history, mathematics, language, etc., all come to his aid. With this mental endowment, he has confidence in himself to go forth into business life, and become worthy the trust which is committed to him.

In this preparation, how much does the study of the classics contribute to the efficiency of the normal teacher, and how much encouragement should be held out to prosecute these studies? Taking the programme of the classical course, and we find that those who are permitted to enter this course, must be prepared to pass a satisfactory examination in the studies of the first year in the elementary English course, which includes arithmetic, grammar, geography, reading, spelling, drawing, penmanship, vocal music and gymnastics. With this amount of knowledge as a basis, the student is now introduced to higher sources of learning.

That the classics should not only not be ignored in our normal schools, but made a prominent source of discipline, rests upon the following considerations: First, the experience of the past and present. And what are the facts connected with our American colleges and schools of mental discipline for the last fifty years? Take the catalogue of our best colleges, and trace the time given to the study of the classics, and we find it to be not less than one-third of the four years' course. Take into account the preparatory and collegiate courses united, say six years, and not less than four-ninths of the time is devoted to the study of the classics. Take the time devoted to preparing for college, say two or two and a half years, about the time allotted to our classical course aside from the time devoted to the practice of teaching, and we find not less than about two-thirds or three-fifths of the time devoted to the classics. Why is this persistence, from generation to generation, to dose so heavily with Latin and Greek, unless these are mental invigorators, which no substitutes are able to supplant; unless from this fountain we are sensible of deriving recuperating strength, by which we may be able to endure the strain which the exigencies of life are almost daily precipitating upon us; unless we are conscious of becoming better able to bear up against the encounters of life, from the recruiting influences which these studies so liberally contribute? Cicero, in his oration for Archias, gives full credit to the power which delineation of character had upon his own mind in managing the republic. "How many images of great men sketched out," says he, "have both the Grecian and Latin writers left us, not only for beholding, but for imitating; which delineations, I, proposing to myself in administering the republic, train my disposition and judgment by this very recognition of excellent men." He farther says, "all books are full, the speeches of wise men are full, all antiquity is full of examples, all which would remain in darkness unless the light of literature had reached them." This *lumen literarum*, or eye of literature, should be kept open and by no means be permitted to become obscured. Polyphemus, mentioned by Virgil, with an eye the size of a Grecian shield, or the lamp of Phœbus, was a far different giant than when described as a huge monster, with his eye taken out. Take away from any well-organized school the life-giving energy which the discipline of the classics affords, and that school will soon lapse into public neglect, and finally into contempt. I am aware that it is frequently thrown out that the leading colleges of our land are modifying their curriculum, by lessening the classical and increasing the scientific studies. Take the catalogue of Yale for the present year, and is not the classical course as full as ever? The professional students, all told, of theology, law, medicine, and the arts, fall short of the number in the regular college course by three hundred. Because a man may arise who possesses the means and holds out inducements for young men to pursue the various branches of physical science, and a goodly number are inclined to take the course, argues not so much against the established course of classical training, as it only indicates a desire on the part of many young men to pursue their favorite studies, or to take a course of training less rigorous than the classical; or because Yale admits into her circle of departments the Sheffield scientific school, does she in the least relax her terms of admission into, or her severity through her academical course ?

But let us come down to the level of facts, and directly trace, as developed before our eyes daily, the bearing which a lesson in Greek or Latin has upon the pupil's mind in comparison with other studies, purely in the light of discipline, taking those parts of mathematics which are regarded as among the most disciplinary. One pupil we may suppose, sits down to a lesson in Sallust's Catiline, another to the forty-seventh problem of Euclid, another to the problem of lights, as found in Robinson's Algebra. The one in Sallust has the first chapter, or about fifteen lines, to translate literally, give derivation of compound words, and parse in full the leading words in the chapter. The second takes the forty-seventh problem of Euclid, and the third develops the problem of lights. At the close of two hours, the papers are called in, and we will suppose that each has performed the task assigned correctly. We suppose all to have been well trained in their respective studies, but to know nothing of the lessons they are about to undertake. The one in geometry sits down to his theorem; he constructs his diagram, making use of the known parts of the science to assist in bringing out the unknown, until he arrives at a point at which he can triumphantly shout, *eureka!*

The one in algebra, taking the problem of lights, proceeds with his statement and solution. He finds the two values of x and $c-x$, proceeds to interpret the double values of x, and is as enthusiastic in the result, after applying the values of x under several hypotheses, as was the student in geometry. In short, the symbols of zero, of determination and infinity which, before, were known as names, are now so beautifully illustrated in their application, that our algebraic pupil feels that *plus* and *minus* signs have magic power, not only to indicate how far truth may be away, as regards intensity of light, but also in what direction. We now give attention to the one who, lexicon and grammar in hand, proceeds in the given time, to seek out what may be found in the first chapter of Sallust's Catiline. He proceeds in the light of his grammar to seek the cases of the declinable words, tracing the inclination, or falling (which the word *casus* signifies), of one word on another. After dissecting the compound words, and discussing the nouns and verbs, cases and genders, and by a tedious process, analyzing the whole, he comes out at last enjoying equal mental triumph with his companions; for that which at first to him seemed a maze, and all without a plan, can now be traced by the mind as a plain path, all the way luminous with the thoughts of the author. The above trials are supposed to have tested the powers of the contestants to grapple with and to overcome the difficulties assigned them, and we will grant that the discipline in each case has been equivalent.

The three nuts of mental discipline which we proposed have been cracked; let us now look after the meats. Time will not permit us to touch but slightly upon two or three excellent results arising to the normal student from the study of the classics. First, we think it would richly repay him to prosecute Latin as one of his studies for two years and a half, for the standard it would afford him in grammatical analysis. We speak of Latin not as superior to Greek, except as the principles originally in Greek, transferred to a Latin garb, are more acceptable to English scholars, because expressed in the same alphabet as their mother tongue.

There is much said nowadays about improvements in the study of English grammar. Among other things, a multitude of diagrams and tabulations are used to encourage and assist the plodding grammarian.

The frame work of grammar, in our estimation, is found in Latin, and he who acquires the Latin language, and masters its grammatical construction, even so far as tracing and developing the same through three books of Cæsar's Commentaries and Sallust's Catiline, possesses a far better apprehension and more correct views of the grammatical construction of his own language, than he would gain by studying any amount of English grammars during a much longer time. Again, to what sources shall we refer for better models of style than to the classics? How few of our youth nowadays have intelligent styles of thought and expression. Their reading may be most extensive, and yet very slight impressions are made upon the mind. As a corrective to this tendency, dose well with Latin; give first, a ten weeks' drill in Sallust's Catiline, and if that prove not sufficient, another ten weeks' familiarity with the Jugurthan War, and with this discipline they will have in their possession a model of logical thought, terse style, and concise description which, Nessos-like, will abide with them. But some will say, why go to the Latin and Greek for models? The simple reason is, we can go to no higher sources, and we are taught by experience that Latin or Greek is a vehicle of thought which leaves a more lasting impression upon the mind of the pupil than the same amount of English.

Demosthenes felt the necessity of style in speaking; he is said, therefore, to have transcribed Thucydides, his favorite author, eight times, that he might have in his possession a standard to which he might conform his great oratorical powers.

Again, the model traits which are brought out in the study of Cæsar, Cicero, Sallust, Virgil, Xenophon and Homer, in regard to the authors themselves, and in the characters which they delineate, are great incentives to persevering industry and grand accomplishments.

Some are disposed to speak contemptuously of a diploma obtained at the cost of eighty weeks' labor, as in the case of our elementary and advanced English courses, and with reason; for a diploma, although cheaply obtained, has the effect to render the recipient self-satisfied, and precludes the impulse of studying up, and scaling higher Alps upon the Hill of Science. To obviate this tendency, let students in our normal schools more generally take a classical course. Let them moor their bark in the deep classical waters, and after seeking for two and a half years the goodly pearls therein to be found, generous aspirations will be produced within them for higher and more extended attainments.

In conclusion, I offer the following resolution, viz.:

Resolved, That the classical course in our normal schools should be extended to four years, and that no student in this course should be permitted to receive a diploma who has not studied Latin to the amount of one hundred weeks.

A DISCOURSE ON THE LIFE, CHARACTER AND WRITINGS OF GULIAN CROMMELIN VERPLANCK, LL.D.*

By William Cullen Bryant, LL.D.,
Of New York City.

The life of him in honor of whose memory we are assembled, was prolonged to so late a period and to the last was so full of usefulness, that it almost seemed a permanent part of the organization and the active movement of society here. His departure has left a sad vacuity in the framework which he helped to uphold and adorn. It is as if one of the columns which support a massive building had been suddenly taken away; the sight of the space which it once occupied troubles us, and the mind wearies itself in the unavailing wish to restore it to its place.

In what I am about to say, I shall put together some notices of the character, the writings and the services of this eminent man; but the portraiture which I shall draw will be but a miniature. To do it full justice a larger canvas would be required than the one I propose to take. He acted in so many important capacities; he was connected in so many ways with our literature, our legislation, our jurisprudence, our public education, and public charities, that it would require a volume adequately to set forth the obligations we owe to the exertion of his fine faculties for the general good.

Gulian Crommelin Verplanck was born in Wall street, in the city of New York, on the 6th of August, 1786. The house in which he was born was a large yellow mansion, standing on the spot on which the Assay office has since been built. A little beyond this street, a few rods only, lay the island of New York in all its original beauty, so that it was but a step from Wall street to the country. His father, Daniel Crommelin Verplanck, was a respectable citizen of the old stock of colonists from Holland, who for several terms was a member of Congress, and whom I remember as a short, stout old gentleman, commonly called Judge Verplanck, from having been in the latter years of his life a judge of the County Court of Dutchess. Here he resided, in the latter years of his life, on the patrimonial estate, where the son, ever since I knew him, was always in the habit of passing a part of the summer. It had been in the family of the Verplancks ever since their ancestor Gulian Verplanck, with Francis Rombout, in 1683, purchased it, with other lands, of the Wappinger Indians, for a certain amount of money and merchandise, specified in a deed signed by the Sachem Sakoraghuk, and other chiefs, the spelling of whose names seems to defy pronunciation. The two purchasers afterward divided this domain, and to the Verplancks was assigned a tract which they have ever since held.

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This fine old estate has a long western border on the Hudson, and extends easterly for four or five miles to the village of Fishkill. About half a mile from the great river stands the family mansion, among its ancient groves, a large stone building of one story when I saw it; with a sharp roof and dormer windows, beside its old fashioned and well stocked garden. A winding path leads down to the river's edge, through an ancient forest which has stood there ever since Hendrick Hudson navigated the river bearing his name, and centuries before. This mansion was the country retreat of Mr. Verplanck ever since I knew him, and here it was that his grandfather on the paternal side, Samuel Verplanck, passed much of his time during our revolutionary war, in which, although he took no share in political measures, his inclinations were on the side of the mother country.

This Samuel Verplanck, by a custom which seems not to have become obsolete in his time, was betrothed when but seven years old to his cousin Judith Crommelin, the daughter of a wealthy banker of the Huguenot stock in Amsterdam. When the young gentleman was of the proper age he was sent to make the tour of Europe, and bring home his bride. He was married in the banker's great stone house, standing beside a fair Dutch garden, with a wide marble entrance hall, the counting room on one side of it, and the drawing-room, bright with gilding, on the other. When the grandson, in after years, visited Amsterdam, the mansion which had often been described to him by his grandmother, had to him quite a familiar aspect.

The lady from Amsterdam was particularly accomplished, and versed not only in several modern languages, but in Greek and Latin, speaking fluently the Latin, of which the colloquies of her great countryman, Erasmus, furnish so rich a store of phrases for ordinary dialogue. Her conversation is said to have been uncommonly brilliant and her society much sought. During the revolutionary war her house was open to the British officers, General Howe, and others, accomplished men, of whom she had many anecdotes to relate to her grandson, when he came under her care. For the greater part of this time her husband remained at the country seat in Fishkill, quietly occupied with his books and the care of his estate. Meantime, she wrote anxious letters to her father, in Amsterdam, which were answered in neat French. The banker consoled his daughter by saying that "Mr. Samuel Verplanck was a man so universally known and honored, both for his integrity and scholarly attainments, that in the end all would be well." This proved true; the extensive estate at Fishkill was never confiscated, and its owner was left unmolested.

On the mother's side, our friend had an ancestry of quite different political views. His grandfather, William Samuel Johnson, of Stratford, in Connecticut, was one of the revolutionary fathers. Before the revolution, he was the agent of Connecticut in England: when it broke out he took a zealous part in the cause of the revolted colonies; he was a delegate to Congress from his State when Congress sat in New York, and he aided in framing the Constitution of the United States. Afterward, he was President of Columbia college from the year 1787 to the year 1800, when, resigning the post, he returned to Stratford, where he died in 1819, at the age of ninety-two. His father, the great grandfather of the subject of this memoir, was Dr. Samuel Johnson, of Stratford, one of the finest American scholars of his day, and the first President of Columbia college, which, however, he left after nine years, to return and pass a serene old age at Stratford. He had been a congregational minister in Connecticut, but by reading the works of Barrow and other eminent divines of the Anglican church, became a convert to that church, went to England, and taking orders, returned to introduce its ritual into Connecticut. He was the friend of Bishop Berkeley, whose arm-chair was preserved as an heir loom in his family. When in England, he saw Pope, who gave him cuttings from his Twickenham willow. These he brought from the banks of the Thames, and planted on the wilder borders of his own beautiful river, the Housatonic, which at Stratford enters the Sound. They were, probably, the progenitors of all the weeping willows which are seen in this part of the country, where they rapidly grow to a size which I have never seen them attain in any other part of the world.

The younger of these Dr. Johnsons—for they both received the degree of Doctor of Divinity from the University of Oxford—had a daughter Elizabeth, who married Daniel Crommelin Verplanck, the son of Samuel Verplanck, and the only fruit of their marriage was the subject of this memoir. The fair-haired young mother was a frequent visitor with her child to Stratford, where, under the willow trees from Twickenham, as appears from some of her letters, he learned to walk. She died when he was but three years old, leaving the boy to the care of his grandmother, by whom he was indulgently yet carefully reared.

The grandmother is spoken of as a lively little lady, often seen walking up Wall street, dressed in pink satin, and in dainty high-heeled shoes with a quaint jeweled watch swinging from her waist. Wall street was then the fashionable quarter; the city, still in its embryo state, extending but a little way above it; it was full of dwelling-houses, with here and there a church, which has long since disappeared. Over that region of the metropolis where mammon is worshiped in six days out of seven, there now broods on Sunday a sepulchral silence, but then the walks were thronged with church-goers. The boy was his grandmother's constant companion. He was trained by her to love books and study, to which, however, he seems to have had a natural and inherited inclination. It is said that at a very tender age she taught him to declaim passages from Latin authors, standing on a table, and rewarded him with hot pound cake. Another story is, that she used to put sugar plums near his bedside, to be at hand in case he should take a fancy to them in the night. But, as he was not spoiled by indulgence, it is but fair to conclude that her gentle method of educating him was tempered by firmness on proper occasions; a quality somewhat rare in grandmothers. A letter from one of her descendants playfully says:

"It is a picture to think of her, seated at a marvelous Dutch bureau, now in possession of her great-granddaughters, which is filled with a complexity of small and mysterious drawers, talking to the child, while her servant built the powdered tower on her head, or hung the diamond rings in her ears. Very likely, at such times, the child was thrusting his little fingers into the rouge pot, or making havoc with the powder, and perhaps she knew no better way to bring him to order than to tell him of many of a fright of her own in the war, or she may have gone further back in history, and told the boy how her and his Huguenot ancestors fled from France when the bad King Louis forbade every form of worship but his own."

Dr. Johnson, the grandfather of young Verplanck, on the mother's side, came from Stratford to be president of Columbia College, the year after his grandson was born. To him, in an equal degree with his grandmother, we must give the credit of bringing forward the precocious boy in his early studies. I have diligently inquired what school he attended and who were his teachers, but can hear of no other. His father had married again, and to the lively Huguenot lady was left the almost entire charge of the boy. He was a born scholar; he took to books as other boys take to marbles; and the lessons which he received in the household sufficed to prepare him for entering college when yet a mere child, at eleven years of age. He took his first degree four years afterward, in 1801, one year after his maternal grandfather had returned to Stratford. To that place he very frequently resorted in his youth, and there, in the well stored and well arranged library he pursued the studies he loved. The tradition is that he conned his Greek lessons lying flat on the floor with his thumb in his mouth, and the fingers of the other hand employed in twisting a lock of the brown hair on his forehead. He took no pleasure in fishing or in hunting. I doubt whether he ever let off a fowling-piece or drew a trout from the brook in his life. He was fond of younger children, and would recreate himself in play with his little relatives, but was no visitor to other families. His contemporaries, Washington Irving, James K. Paulding and Governeur Kemble, had their amusements and frolics, in which he took no part. According to Mr. Kemble, the elder men of the time held up to the youths the example of young Verplanck, so studious and accomplished, and so ready with every kind of knowledge, and withal of such faultless habits, as a model for their imitation.

I have said that his relatives on the mother's side were of a different political school from his high tory grandmother. From them he would hear of the inalienable rights of the people, and the duty, under certain circumstances, of revolution; from her he would hear of the obligation of loyalty and obedience. The Johnsons would speak of the patriotism, the wisdom, and the services of Franklin the grandmother of the virtues and accomplishments of Cornwallis. The boy, of course, had to choose between these different sides, and he chose the side of his country and of the people.

I think that I perceive in these circumstances how it was that the mind of Verplanck was educated to that independence of judgment, and that self-reliance which in after life so eminently distinguished it. He never adopted an opinion for the reason that it had been adopted by another. On some points, on more I think than is usual with most men, he was content not to decide; but when he formed an opinion it was his own. He had no hesitation in differing from others if he saw reason; indeed, he sometimes showed that he rather liked to differ, or chose at least, by questioning their opinions, to intimate that they were prematurely formed. Another result of the peculiar political education which I have described, was the fairness with which he judged of the characters and motives of men who were not of his party. I saw much, very much of him while he was a member of Congress, when political animosities were at their fiercest, and I must say that I never knew a party man who had less party rancor, or who was more ready to acknowledge in his political opponents the good qualities which they really possessed.

After taking his degree he read law in the office of Josiah Ogden Hoffman, an eminent member of the New York bar, much esteemed in social life, whose house was the resort of the best company in New York. His first public address, a Fourth of July oration, was delivered when he was eighteen years of age. It was printed, but no copy of it is now to be found. In due season he was admitted to the bar, and opened an office for the practice of law in New York. A letter from Dr. Moore, formerly president of Columbia College, relates that Verplanck and himself took an office together on the east side of Pearl street, opposite to Hanover square. "Little business as I had then," proceeds the Doctor, "he seemed to have still less. Indeed, I am not aware that he had, or cared to have, any legal business whatever. He spent much of his time out of the office, and was not very studious when within; but it was evident that he read or had read elsewhere to good purpose, for though I read more Greek than law and thought myself studious, I had occasion to discover more than once that he was a better Grecian than I, and could enlighten my ignorance." From other sources I learn that in his legal studies he delighted in the reports of law cases in Norman French, that he was fond of old French literature, and Rabelais in the perplexing French of the original. It is mentioned in some accounts of his life that he was elected in 1811 to the New York House of Assembly by a party called the malcontents, but I have not had the means of verifying this account, nor am I able to discover what were the objects for which the party called malcontents was formed. In this year an incident occurred of more importance to him than his election to the Assembly.

On the 8th of August, 1811, the annual commencement of Columbia college was held in Trinity Church. Among those who were to receive the degree of Bachelor of Arts, was a young man named Stevenson, who had composed an oration to be delivered on the platform. It contained some passages of a political nature, insisting on the duty of a representative to obey the will of his constituents. Political parties were at that time much exasperated against each other, and Dr. Wilson, of the college, to whom the oration was submitted, acting, it was thought, at the suggestion of Dr. John Mason, the eloquent divine, who was then provost of the college, struck out the passages in question and directed that they should be omitted in the delivery. Stevenson spoke them notwithstanding, and was then privately informed by one of the professors that his degree would be denied him. Yet, when the diplomas were delivered, he mounted the platform with the other graduates, and demanded the degree of Dr. Mason. It was refused because of his disobedience. Mr. Hugh Maxwell, afterward eminent as an advocate, sprang upon the platform and appealed to the audience against this denial of what he claimed to be the right of Stevenson. Great confusion followed, shouts, applauses and hisses, in the midst of which Verplanck appeared on the platform saying: "The reasons are not satisfactory; Mr. Maxwell must be supported," and then he moved "that the thanks of the audience be given to Mr. Maxwell for his spirited defence of an injured man." It was some time before the tumult could be allayed, the audience taking part with the disturbers; but the result was that Maxwell, Verplanck and several others were prosecuted for riot in the mayor's court. De Witt Clinton was then mayor of New York. In his charge to the jury, he inveighed with great severity against the accused, particularly Verplanck, of whose conduct he spoke as a piece of matchless impudence, and declared the disturbance to be one of the grossest and most shameless outrages he had ever known. They were found guilty; Maxwell, Verplanck and Stevenson were fined two hundred dollars each, and several others less. An appeal was entered by the accused, but afterward withdrawn. I have heard one of our judges express a doubt whether this disturbance could properly be considered as a riot, but they did not choose to avail themselves of the doubt, if there was any, and submitted.

There is this extenuation of the rashness of these young men, that Dr. Mason, to whom was attributed the attempt to suppress certain passages in Stevenson's oration, was himself in the habit of giving free expression to his political sentiments in the pulpit. He belonged to the federal party, Stevenson to the party then called republican.

I have said the accused submitted, but the phrase is scarcely accurate. Verplanck took his own way of obtaining redress, and annoyed Clinton with satirical attacks for several years afterward. Some of these appeared in a newspaper called the *Corrector*, but those which attracted the most attention, were the pamphlets styled Letters of Abimelech Coody, Ladies' Shoemaker, the first of which was published in 1811, addressed to Dr. Samuel Latham Mitchill.

The war went on until Clinton or some friend was provoked to answer in a pamphlet entitled An Account of Abimelech Coody and other celebrated worthies of New York, in a letter from a Traveller. The writer satirizes not only Verplanck, but James K. Paulding and Washington Irving, of whose History of New York he speaks disparagingly. In what he says of Verplanck, he allows himself to refer to his figure and features as subjects of ridicule. This war I think was closed by the publication of "The Bucktail Bards," as the little volume is called, which contains The State Triumvirate, a Political Tale, and the Epistles of Brevet Major Pindar Puff. These I have heard spoken of as the joint productions of Verplanck and Rudolph Bunner, a scholar and a man of wit. The State Triumvirate is in octosyllabic verse, and in the manner of Swift, but the allusions are obscure, and it is a task to read it. The notes, in which the hand of Verplanck is very apparent, are intelligible enough, and are clever, caustic and learned. The epistles, which are in heroic verse, have striking passages, and the notes are of a like incisive character. De Witt Clinton, then Governor of the State, valued himself on his devotion to science and literature, but he was sometimes obliged, in his messages and public discourses, to refer to compends which are in everybody's hands, and his antagonists made this the subject of unsparing ridicule.

In the family of Josiah Ogden Hoffman, lived Mary Eliza Fenno, the sister of his wife, and daughter of John Ward Fenno, originally of Boston, and afterward proprietor of a newspaper published in Philadelphia, entitled the *Gazette of the United States.* Between this young lady and Verplanck there grew up an attachment, and in 1811 they were married. I have seen an exquisite miniature of her by Malbone, taken in her early girlhood when about fifteen years old—beautiful as an angel, with light chestnut hair and a soft blue eye, in the look of which is a touch of sadness, as if caused by some dim presentiment of her early death. I remember hearing Miss Sedgwick say that she should always think the better of Verplanck for having been the husband of Eliza Fenno. Several of her letters written to him before their marriage are preserved, which, amidst the sprightliness natural to her age, show a more than usual thoughtfulness. She rallies him on being adopted by the mob, and making harangues at ward meetings. She playfully chides him for wandering from the apostolic church to hear popular preachers and clerks that sing well; which she regards as crimes against the memory of his ancestors—an allusion to that part of the family pedigree which traced his descent in some way from the royal line of the Stuarts. She rallies him on his passion for old books, remarking that some interesting works had just appeared which must be kept from him till he reaches the age of three score, when they will be fit for his perusal. She writes to him from Boston, that he is accounted there an amazingly plain spoken man—he had called the Boston people heretics. She writes to him in Stratford, imagining him in Bishop Berkeley's arm chair, surrounded by family pictures and huge folios. These letters were carefully preserved by her husband till his death, along with various memorials of her whom he had lost; locks of her sunny brown hair, the diamond ring which he had placed on her finger when they were engaged to each other, wrapt in tresses of the same bright hair, and miniatures of her, which the family never heard of till he died; all variously disposed among the papers in the drawers of his desk; so that whenever he opened it, he might be reminded of her, and her memory might become a part of his daily life. With these were preserved some letters of his own, written to her about the same time, and of a sportive character. In one of these he laments the passing away of the good old customs, and simple ways of living in the country, supplanted by the usages of town life. Everybody was then reading Cœlebs in Search of a Wife, and Verplanck, who had just been looking over some of the writings of Wilberforce, sees in it resemblances to his style, which led him to set down Wilberforce as the author.

He lived with his young wife five years, and she bore him two sons, one of whom died at the age of thirty unmarried, and the other has become the father of a numerous family. Her health failing he took her to Europe, in the hope that it might be restored by a change of air and scene, but after languishing a while she died at Paris, in the year 1817. She sleeps in the cemetery of Pere La Chaise, among monuments inscribed with words strange to her childhood, while he, after surviving her for sixty-three years, yet never forgetting her, is laid in the ancestral burying ground at Fishkill, and the Atlantic ocean rolls between their graves.

He remained in Europe a little while after this event, and having looked at what the continent had to show him, went over to England. In his letters to his friends at home he spoke pathetically of the loss of her who was the blessing of his life, of the delight with which, had she lived, she would have looked at so many things in the old world now attracting his attention; and of the misfortune of his children to be deprived of her care and guidance. In one of his letters he speaks enthusiastically of the painter, Allston, with whose genius he was deeply impressed as he looked on the grand picture of Daniel interpreting the Dream of Belshazzar, then begun but never to be finished. In the same letter he relates this anecdote:

"You may expect another explosion of mad poetry from Lord Byron. Lord Holland, who returned from Geneva, a few days ago, told Mr. Gallatin that he was the bearer of a considerable cargo of verses from his lordship to Murray the publisher, the subject not known. That you may have a higher relish for the new poem, I give you a little anecdote which is told in London. Some time ago Lord Byron's books were sold at auction, where a gentleman purchased a splendid edition of Shakespeare. When it was sent home a volume was missing. After several fruitless inquiries of the auctioneer the purchaser went to Byron. 'What play was in the volume?' asked he. 'I think Othello.' 'Ah! I remember. I was reading that when Lady Byron did something to vex me. I threw the book at her head and she carried it out of the room. Inquire of some of her people and you will get your book.'"

While abroad, Verplanck fell in with Dr. Mason, who had refused Stevenson his degree. The two travellers took kindly to each other, and the unpleasant affair of the college disturbance was forgotten.

In 1818, after his return from Europe, he delivered before this Society the noble anniversary discourse in which he commemorates the virtues and labors of some of those illustrious men who, to use his words, "have most largely contributed to raise or support our national institutions, and to form or elevate our national character." Las Casas, Roger Williams, William Penn, General Oglethorpe, Professor Luzac, and Berkeley are among the worthies whom he celebrates. It has always seemed to me that this is one of the happiest examples in our language of the class of compositions to which it belongs, both as regards the general scope and the execution, and it is read with as much interest now as when it was first written.

Mr. Verplanck was elected in 1820 a member of the New York House of Assembly, but I do not learn that he particularly distinguished himself while in that body. In the year following he was appointed in the General Theological Seminary of the Episcopal Church, Professor of the Evidences of Revealed Religion and Moral Science in its relations to Theology. For four years he performed the duties of this professorship, with what ability is shown by his Treatise on the Evidences of Christianity, the fruit of his studies during this interval. It is principally a clear and impressive view of that class of proofs of the Christian religion which have a direct relation to the intellectual and moral wants of mankind. For he was a devout believer in the Christian gospel, and cherished religious convictions for the sake of their influence on the character and the life. This work was published in 1824, about the time that he resigned his professorship.

It was in 1824, that, on a visit to New York, I first became acquainted with Verplanck. On the appearance of a small volume of poems of mine, containing one or two which have been the most favorably received, he wrote, in 1822, some account of them for the New York American, a daily paper which not long before had been established by his cousin, Johnson Verplanck, in conjunction with the late Dr. Charles King. He spoke of them at considerable length and in the kindest manner. As I was then an unknown literary adventurer, I could not but be grateful to the hand that was so cordially held out to welcome me, and when I came to live in New York, in 1825, an intimacy began in which I suspect the advantage was all on my side.

It was in 1825 that he published his Essay on the Doctrine of Contracts, in which he maintained that the transaction between the buyer and seller of a commodity should be one of perfect frankness and an entire absence of concealment; that the seller should be held to disclose everything within his knowledge which would affect the price of what he offered for sale, and that the maxim which is compressed into two Latin words, *caveat emptor*—the maxim that the buyer takes the risk of a bad bargain—is not only a selfish but a knavish and immoral rule of conduct, and should not be recognized by the tribunals. The question is ably argued on the grounds of an elevated morality, but I have heard jurists object to the doctrine of this essay, that if it were to prevail it would greatly multiply the number of lawsuits.

In 1825, Mr. Verplanck was elected one of the three representatives in Congress, to which this city was then entitled. He immediately distinguished himself as a working member. This appellation is given in Congress to members who labor faithfully in committees, consider petitions and report upon them, investigate claims, inquire into matters referred to their judgment, frame bills and present them through their chairman. Besides these, there are the talking members who take part in every debate, often without knowing anything of the question, save what they learn while the debate is proceeding, and the idle members, who do nothing but vote—generally, I believe, without knowing anything of the question whatever; but to neither of these classes did Verplanck belong. He was a diligent, useful and valued member of the Committee of Ways and Means, and at an important period of our political history was its chairman.

Then arose the great controversy concerning the right of a State to refuse obedience at pleasure to any law of Congress, a right contended for under the name of nullification by some of the most eminent men of the south, whose ability, political influence, and power of putting a plausible face on their heresy, gave their cause at first an appearance of great strength, and seemed to threaten the very existence of the Union.

With their denial of the binding force of any law of Congress which a State might think proper to set aside, these men combined another argument. They denied the power of Congress, under the Constitution, to levy duties on imported merchandise, for the purpose of favoring the home manufacturer, and maintained that it could only lay duties for the sake of raising a revenue. Mr. Verplanck favored neither this view nor their theory of nullification. He held that the power to lay duties being given to Gongress, without reservation by the Constitution, the end or motive of laying them was left to the discretion of the Legislature. He showed also that the power to regulate commerce given to that body in the Constitution, was, from an early period in our history, held to imply a right, by laying duties, to favor particular traffics, products or fabrics.

This view of the subject was presented with great skill and force in a pamphlet entitled "A Letter to Colonel William Drayton, of South Carolina," published in 1831. Mr. Verplanck was through life a friend to the freedom of exchange, but he would not use in its favor any argument which did not seem to him just. His pamphlet was so ably reasoned that William Leggett said to him, in my presence, "Mr. Verplanck, you have convinced me; I was, till now, of a different opinion from yours, but you have settled the question against me. I now see that whatever may be the injustice of protective duties, Congress has the constitutional right to impose them."

It was while this controversy was going on that President Jackson issued his proclamation warning those who resisted the revenue laws that their resistance was regarded as rebellion, and would be quelled at the bayonet's point. Mr. Calhoun and his friends were not prepared for this; indeed, I do not think that in any of his plans for the separate action of the slave States, he contemplated a resort to arms on either side. They looked about them to find some plausible pretext for submission, and this the country was not unwilling to give. It was generally admitted that the duties on imported goods ought to be reduced, and Mr. McLane, Secretary of the Treasury, and Mr. Verplanck, chairman of the Committee of Ways and Means, each drew up a plan for lessening the burdens of the tariff.

Mr. McLane had just returned from a successful mission to Great Britain, and had the advantage of considerable personal popularity. He was a moderate protectionist, and with great pains drew up a scheme of duties which kept the protection of home manufactures in view. Some branches of industry, he thought, were so far advanced that they would bear a small reduction of the duty; others a still larger; others were yet so weak that they could not prosper unless the whole existing duty was retained. The scheme was laid before Congress, but met with little attention from any quarter; the southern politicians regarded it with scorn, as made up of mere cheese-parings. Mr. Verplanck's plan of a tariff was more liberal. He was not a protectionist, and his scheme contemplated a large reduction of duties—as large as it was thought could possibly be adopted by Congress—yet so framed as to cause as little inconvenience as might be to the manufacturers. It was thought that Mr. Calhoun and his friends would readily accept it as affording them a not ignoble retreat from their dangerous position.

While these projects were before Congress, Mr. Littell, a gentleman of the free-trade school, and now editor of the "Living Age," drew up a scheme of revenue reform more thorough than either of the others. It proposed to reduce the duties annually until, at the end of ten years the principle of protection, which was what the southern politicians complained of, should disappear from the tariff, and a system of duties take its place which should in no case exceed the rate of twenty per cent on the value of the commodity imported. The draft of this scheme was shown to Mr. Clay; he saw at once that it would satisfy the southern politicians; he adopted it, brought it before Congress, urged its enactment in several earnest speeches, and by the help of his great influence over his party it was rapidly carried through both houses, under the name of the Compromise Tariff, to the astonishment of the friends of free trade, the mill owners, the Secretary of the Treasury, the Committee of Ways and Means, and, I think, the country at large. I thought it hard measure for Mr. Verplanck that the credit of this reform should be taken out of his hands by one who had always been the great advocate of protective duties; but this was one of the fortunate strokes of policy which Mr. Clay, when in the vigor of his faculties, had the skill to make. He afterward defended the measure as inflicting no injury upon the manufacturers, and it never appeared to lessen the good will which his party bore him.

About this time I was witness to a circumstance which showed the sagacity of Mr. Verplanck in estimating the consequences of political measures. Mr. Van Buren had been sent by President Jackson as our Minister to the British Court while Congress was not in session, and the nomination yet awaited confirmation by the Senate. It led to a long and spirited debate, in which Mr. Marcy uttered the memorable maxim, "To the victor belong the spoils of the enemy," which was so often quoted against him. I was in Washington, dining with Mr. Verplanck, when the vote on this nomination was taken. As we were at the table, two of the Senators, Dickinson of New Jersey and Tazewell of Virginia, entered. Verplanck, turning to them, asked eagerly, "How has it gone?" Dickinson, extending his left arm, with the fingers closed, swept the other hand over it, striking the fingers open, to signify that the nomination was rejected. "There," said Verplanck, "that makes Van Buren President of the United States." Verplanck was by no means a partisan of Van Buren, but he saw what the effect of that vote would be, and his prediction was, in due time, verified.

While in Congress, Mr. Verplanck procured the enactment of a law for the further security of literary property. To use his own words, it "gave additional security to the property of authors and artists in their works, and more than doubled the term of legal protection to them, besides simplifying the law in various respects." It was passed in 1831, though Mr. Verplanck had begun to urge the measure three years before, when he brought in a bill for the purpose, but party strife was then at its height, and little else than the approaching elections were thought of by the members of Congress. When party heat had cooled a little, he gained their attention, and his bill became a law. If we had now in Congress a member so much interested for the rights of authors and artists, and at the same time so learned, so honored, and so persevering, we might hope that the inhospitable usage which makes the property of the American author in Great Britain and of the British author in the United States the lawful prize of whosoever chooses to appropriate it to himself, would be abolished.

A dinner was given to Verplanck on his return from Washington, in the name of several literary gentlemen of New York, but the expense was, in fact, defrayed by a generous and liberal-minded bookseller, Elam Bliss, who held authors in high veneration, and only needed a more discriminating perception of literary merit, to make him, in their eyes at least, a perfect bookseller. On this occasion Mr. Verplanck spoke well and modestly of the part he had taken in procuring the passage of the new law; mentioned with especial honor the "first and ablest champion" who had then "appeared in this cause," the Hon. Willard Phillips, who had discussed the question in the "North American Review;" referred to the opinions of various eminent publicists, and pointed out that our own Constitution had recognized the right of literary property, while it left to Congress the duty of securing it. He closed with an animated view of what American literature ought to be, and might be, under circumstances favorable to its wholesome and vigorous growth. We listened with delight, and were proud of our representative.

During Mr. Verplanck's fourth and last term in Congress, he became separated from his associates of the Democratic party by a difference in regard to the Bank of the United States. General

Jackson had laid rough hands on this institution and removed to the State banks the public money which had till then been intrusted to its keeping. Many of our best men had then a high opinion of the utility of the bank, and thought much better of its management than, as afterward appeared, it deserved. The Whig party declared itself in favor of the bank. Mr. Calhoun and the southern politicians of his immediate school joined them on this question, and Mr. Verplanck, who regarded the bank with a friendly eye, found himself on the same side, which proved to be the minority. The time arrived for another election of members of Congress from this city. The Democratic party desired to re-elect Mr. Verplanck, if some assurance could be obtained from him that he would not oppose the policy of the administration in regard to the bank. That party understood very well his merits and usefulness, and made a strong effort to retain him, but he would give no assurance, even to pursue a neutral course, on the bank question, and accordingly his name was reluctantly dropped from their list of nominations. A long separation ensued between him and those who, up to that time, had been his political associates.

In 1834, the Whig party, looking for a strong candidate for the mayoralty of the city, offered the nomination to Verplanck, who accepted it. On the other side, the Democrats brought forward Cornelius W. Lawrence, a man of popular manners and unquestioned integrity. Those were happy days when, in voting for a mayor, the citizen could be certain that he would not vote amiss, and that whoever succeeded in the election, the city was sure of an honest man for its chief officer. One would have thought that this consideration might make the election a quiet one, but it was not so; the struggle was for party supremacy, and it was violent on both sides. At that time the polls were kept open for three days, and each day the excitement increased; disorders took place; some heads were broken, and at last it appeared that Lawrence was elected mayor by a majority of about two hundred votes.

While in Congress, Verplanck had leisure, during the interval between one session and another, for literary occupations. He wrote about one-third of an annual collection of miscellanies entitled the "Talisman," which was published by Dr. Bliss, in the year 1827 and the two following years. To these volumes he contributed the "Peregrinations of Petrus Mudd," a humorous and lively sketch, founded on the travels of a New Yorker of the genuine old stock, who, when he returned from wandering over all Europe and part of Asia, set himself down to study geography in order to know where he had been. Of the graver articles, he wrote "De Gourges," a chapter from the history of the Huguenot colonists of this country, "Gelyna, a Tale of Albany and Ticonderoga," and several others. In conjunction with Robert C. Sands, a writer of a peculiar vein of quaint humor, he contributed two papers to the collection, entitled "Scenes in Washington," of a humorous and satirical character. He disliked the manual labor of writing and was fond of dictating while another held the pen. I was the third contributor to the "Talisman," and sometimes acted as his amanuensis. In estimating Verplanck's literary character, these compositions, some of which are marked by great beauty of style and others by a rich humor, should not be overlooked. The first volume of the "Talisman" was put in type by a young Englishman named Cox, who, while working at his desk as a printer, composed a clever review of the work, which appeared in the "New York Mirror," and of which Verplanck often spoke with praise.

In 1833, Verplanck collected his public speeches into a volume. Among these is one delivered in August of that year, at Columbia College, in which he holds up to imitation the illustrious examples of great men educated at that institution. In one of those passages of stately eloquence which he knew so well to frame, he speaks of the worth of his old adversary, De Witt Clinton, the first graduate of the college after the peace of 1783, and pays due "honor to that lofty ambition which taught him to look to designs of grand utility, and to their successful execution as his arts of gaining or redeeming the confidence of a generous and public spirited people." In the same discourse he pronounced the eulogy of Dr. Mason, who had died a few days before. In the same year, Verplanck, at Geneva College, delivered an address on the "Right Moral Influence and Use of Liberal Studies," and the next year, at Amherst College, another on the converse of that subject, namely, the "Influence of Moral Causes upon Opinion, Science and Literature." In 1836, he gave a discourse on "The Advantages and Dangers of the American Scholar." Of these addresses let me say, that I know of no compositions of their class which I read with more pleasure or more instruction. Enlarged views, elevated sentiments, a hopeful and courageous spirit, a wide knowledge of men and men's recorded experience, and a manly dignity of style, mark them all as the productions of no common mind.

After separating from the Democratic party, Mr. Verplanck was elected by the Whigs, in 1837, to the Senate of the State of New York, while that body was yet a Court for the Correction of Errors, a tribunal of the last resort; and in that capacity decided questions of law of the highest magnitude and importance. Nothing in his life was more remarkable than the new character in which he now appeared. The practiced statesman, the elegant scholar and writer of graceful sketches, the satirist, the critic, the theologian, started up a profound jurist. During the four years in which he sat in this court, he heard the arguments in nearly every case which came before it, and delivered seventy-one opinions; not simply his written conclusions, but elaborate judgments, founded on the closest investigation of the questions submitted, the most careful and exhaustive examination of authorities, and a practical, comprehensive and familiar acquaintance with legal rules and principles, even those of the most technical nature, which astonished those who knew that he had never appeared for a client in court, or sat before in a judicial tribunal. I use in this the language of an able lawyer, Judge Daly, who has made this part of Verplanck's labors a subject of special study. As examples of his judicial ability, I may instance his examination of the whole structure of our State and Federal government in the case of Delafield against the State of Illinois, where the question came up whether an individual could sue a State; his survey of the whole law of marine insurance and the principles on which it is founded, in the case of the American Insurance Company against Bryan; his admirable statement of the reasons on which rests the law of proscription, or right established by usage, in the case of Post against Pearsall; his exposition of the extent of the right which in this country the owners of land on the borders of rivers and navigable streams have in the bed of the river, in Kempshall's case; a masterly opinion, in which the whole court concurred. I might also mention the great case of Alice Lispenard, in which he considered the degree of mental capacity requisite to make a will; a case involving a vast amount of property in this city, decided by his opinion. There is also the case of Smith against Acker, relating to the taint of fraud in mortgages of personal property, in which he carried the court with him against the Chancellor and overturned all the previous decisions. Not less important is his elaborate, learned and exhaustive opinion in the case of Thompson against the People, decided by a single vote and by his opinion; in which he examined the true nature of franchises conferred on individuals in this country by the sovereign power, the right to construct bridges over navigable streams, and the proper operation of the writ of *quo warranto*. These opinions of Verplanck form an important part of the legal literature of our State. If he had made the law his special pursuit, and been placed on the bench of one of our higher tribunals, there is no degree of judicial eminence to which he might not have aspired. The standing committee of the diocese of New York, of which he was a member, in their resolutions expressive of sorrow for his death, spoke of him as one whose judicial wisdom and familiarity with the principles and practice of the law, made his counsels of the highest value.

In 1844, after, I doubt not, some years of previous study, appeared the first number of Verplanck's edition of Shakespeare, issued by Harper & Brothers. The numbers appeared from time to time till 1847, when the work was completed. He made some corrections of the text, but never rashly; he selected the notes of other commentators with care; he added some excellent ones of his own, and wrote admirable critical and historical prefaces to the different plays. This edition has always seemed to me the very one for which the general reader has occasion.

Almost ever since the American revolution, a Board of Regents of the University of the State of New York has existed, on which is laid the duty of visiting and superintending in a general way our institutions of education above the degree of common schools. It consists of twenty-three members, including the Governor and Lieutenant-Governor, the Secretary of State and the Superintendent of Public Instruction; the other nineteen members are appointed by the Legislature. The Board assists at the incorporation of all colleges and academies, looks into their condition, interposes in certain specified cases, receives reports from them and makes annual reports to the Legislature, and confers by diploma such degrees as are granted by any college or university in Europe. Mr. Verplanck was appointed a member of this Board in 1826, in place of Matthew Clarkson, who had been a Regent ever since 1787. In 1855 he was appointed Vice-Chancellor of the University, and to the time of his death punctually attended the meetings of the Board, shared in its discussions and bore his part in its various duties. In 1844 the State Library was placed under the superintendence of the Regents. Mr. Verplanck was immediately put on the library committee, where his knowledge of books and editions of books made his services invaluable. There were then about ten thousand volumes in the collection, and many of these consisted of broken sets. Under the care of the Regents, Mr. Verplanck principally, who gave it his particular attention, it has grown into a well selected, well arranged library of more than eighty-two thousand volumes. About the same time the State Cabinets of Natural History were put under the care of the Board, and these have equally prospered, every year adding to their extent, until now the Regents publish annually, catalogues of the additions made to them from various sources, and, occasionally, papers communicated by experts in natural history.

Every year, in the month of August, a University Convocation is held at Albany, to which are invited all the leading teachers and professors of our colleges and academies, and carefully prepared papers relating to education are read. At the first of these conventions, in 1863, Mr. D. J. Pratt, now the assistant secretary of the Board, had read a paper on "Language as the Chief Educator and the noblest Liberal Art," in which he dwelt upon the importance of studying the ancient classic authors in their original tongues. Mr. Verplanck remarked that in what he had to say he would content himself with relating an anecdote respecting the first Napoleon, which he had from a private source, and which had never been in print. The emperor wishing to keep himself advised of what was passing in the University of France, yet without attracting public attention, was wont on certain occasions to send to the university a trustworthy and intelligent person from his household, who was to bring back a report. This man at one time reported that the question of paying more attention to the mathematical sciences had been agitated. On this Napoleon exclaimed with emphasis: "Go to the Polytechnic for mathematics; but classics, classics, classics for the University." At another time Verplanck, still occupied with his favorite studies, gave the convention an address on the pronunciation of the Latin language, in which he came to the conclusion that of all the branches of the Latin race, the Portuguese in their pronunciation of Latin make the nearest approach to that of the ancient Romans. He was desired by the members of the Board to write out the address for publication; but this was never done. Verplanck, as I have already remarked, was an unwilling scribe, and did not like to handle the pen.

The annual reports of the Regents, which are voluminous documents, give much the same view of the arrangements for public education in the State as is obtained of a country by looking down upon it from an observatory. Every college, every academy, every school, not merely a private enterprise, and above the degree of common school, makes its yearly report to the Regents, and these are embodied in the general report which they make to the Legislature, so that the whole great system, with all its appendages, its libraries, its revenues, its expenditures, the number of its teachers and its pupils, and the opportunities of instruction which it gives, lies before the eye of the reader. It now comprehends twenty colleges of literature and science, three law departments, two medical colleges, two hundred or more academies, or schools of that class, besides the Normal school, at Albany.

In his discourse delivered before this society in 1818, Mr. Verplanck had apostrophized his native country as the Land of Refuge. He could not then have foreseen how well in aftertimes it would deserve this name, nor what labors and responsibilities the care of that mighty throng who resort to our shores for work and bread would cast upon him. Shortly before the year 1847 the number of emigrants from Europe arriving in our country had rapidly and surprisingly increased. The famine in Ireland had caused the people of that island to migrate to ours in swarms like those which the populous north poured from her frozen loins to overwhelm the Roman empire. In the ten years from 1845 to 1854 inclusive, more than a million and a half of Irish emigrants left the United Kingdom. The emigration from Germany had also prodigiously increased and promised to become still larger. All these were exposed, and the Germans in a particular manner, on account of their ignorance of our language, to the extortions of a knavish class, called runners, and of the keepers of boarding-houses, who often defrauded them of all they possessed, and left them to charity. Most of those who, after these extortions, had the means, made their way into the interior and settled upon farms, but a large number remained to become inmates of the alms-house, or to starve and sicken in crowded and unwholesome rooms. Mr. Kapp, for some time a Commissioner of Emigration, relates, in his interesting work on emigration, an example of the manner in which these poor creatures were cheated. An emigrant came to a boarding-house keeper to pay his bill. "It is eighteen dollars," said the landlord. "Why," said the emigrant, "did you not agree to board me for sixpence a meal and threepence for a bed?" "Yes," was the answer, "and that is just seventy-five cents a day;

you have been here eight days, and that makes just eighteen dollars."

These things had become a grievous scandal, and it was clear that something must be done to protect the emigrant from pillage, and the country from the burden of his support. The Act of May, 1847, was therefore passed by the New York Legislature. It named six gentlemen of the very highest character, Gulian C. Verplanck, James Boorman, Jacob Harvey, Robert B. Minturn, William F. Havemeyer, and David C. Colden, who were to form a Board of Commissioners of Emigration, charged with the oversight and care of this vast influx of strangers from the Old World. To these were added the Mayors of New York and Brooklyn, and the Presidents of the German Society and the Irish Emigrant Society. Every master of a vessel was, within twenty-four hours of his arrival, to give this board a list of his passengers, with a report of their origin, age, occupation, condition, health and other particulars, and either give bonds to save the community from the cost of maintaining them in case they became paupers, or pay for each of them the sum of two dollars and a half. The payment of money has been preferred, and this has put into the hands of the Commissioners a liberal revenue, faithfully applied to the advantage of the emigrants.

Mr. Havemeyer was chosen President of the Board, but resigned the office after a few months, and was succeeded in it by Mr. Verplanck, who held it till the day of his death. Under the management of the Commissioners, the Bureau of Emigration, becoming with almost every year more perfectly adapted to its purpose, has grown to vast dimensions, till it is now like one of the departments of government in a great empire. Whoever passes by Ward's Island, where the tides of the East river and the Sound meet and rush swiftly to and fro through their narrow channels, will have some idea of what the board has done, as he sees the domes and spires of that great cluster of buildings, forming a vast caravansary in which the poorer class of emigrants are safely lodged, before they can be sent into the interior or find employment here. Here are barracks for the men, a spacious building for the women and children, a nursery for children of a tender age, Catholic and Protestant chapels, a dispensary, workshops, a lunatic asylum, fever wards, surgical wards, storehouses, residences of the physicians and other persons employed in the care of the place, and out-houses and offices of various kinds. Here, too, rise the stately turrets of the spacious new hospital styled the Verplanck Emigrant Hospital, in honor of the great philanthropist, for such his constant and noiseless labors in this department of charity entitle him to be called.

The Commissioners found that they could not protect the emigrants from imposition without a special landing place from which they could wholly exclude the rascal crew who cheated them. It took eight years to obtain this from the New York Legislature; but at last, in 1855, it was granted, and the old fort at the foot of Manhattan Island, called Castle Garden, was leased for this purpose. This is now the Emigrants' Landing, the gate of the New World for those who, pressing westward, throng into it from the Old. Night and day it is open, and through this passage the vast tide of stranger population, which is to mingle with and swell our own, rushes like the current of the Bosphorus from the Black sea toward the Propontis and the Hellespont, to help fill the great basin of the Mediterranean. What will be the condition of mankind when the populations of the two hemispheres, the east and the west, shall have found, as they must, a common level, and when the human race, now struggling for room in its ancient abodes, shall look in vain for some unoccupied region where a virgin soil is waiting to reward the laborer with bread?

As he enters Castle Garden the emigrant undergoes inspection by a competent physician, and if he be aged, sick, or in any way disabled, the master of the vessel must give a special bond for his maintenance. He is introduced into the building; here he finds one department in which he is duly registered, another from which he receives such information as a stranger requires, another from which his luggage is dispatched to its destination, another at which attend clerks, skilled in the languages of continental Europe, to write his letters, another at which railway tickets are procured without danger of extortion, another at which fair arrangements are made with boarding-houses, another from which, if sick or destitute, he is sent to Ward's Island, and half a dozen others, important as helps to one who has no knowledge of the usages of the country to which he has come. I refer to these arrangements, among a multitude of others, in order to show what administrative talent and what constant attention were necessary to insure the regular and punctual working of so vast a system. To this duty Mr. Verplanck, aided by able and disinterested associates like himself, gave the labors of a third of a century, uncompensated save by the consciousness of doing good. The composition of this board has just been changed by the Legislature of the State, in such a manner as unfortunately to introduce party influences, from which, during all the time of Mr. Verplanck's connection with, it, it had been kept wholly free.

Yet Mr. Verplanck had his party attachments, though he never suffered them to lead him out of the way he had marked for himself. He would accompany a party, but never follow it. His party record is singular enough. He was educated a Federalist, but early in life found himself acting against the federal party. He was with the Whigs in supporting General Harrison for the presidency, and claimed the credit of suggesting his nomination. Mr. Clay he would never support on account of his protectionist principles, and when that gentleman was nominated by the Whigs he left them and voted for Mr. Polk, though he was disgusted by the trick which obtained the vote of Pennsylvania for Mr. Polk under the pretense of his being a protectionist. Subsequently he supported General Taylor, the Whig candidate for the Presidency, but the nomination of Mr. Buchanan, in 1857, saw him once more with the Democrats, from whom he did not again separate. When the proposal to make government paper a legal tender for debts was before Congress, he opposed it with great zeal, writing against it in the democratic journals. I agreed with him that the measure was an act of folly, for which I could find no excuse, but he almost regarded it as a public crime. He vehemently disapproved, also, of the arbitrary arrests made by our government during the war, some of which, without question, were exceedingly ill advised. His zeal on these points, I think, made him blind to the great issues involved in our late civil war, and led his usually clear and liberal judgment astray.

I have not yet mentioned various capacities in which he served the public without any motive but to administer to the public welfare. He was, from a very early period a trustee of the Society Library, in which he took great interest, delighting to make additions to its stock of books, and passing much time in its alcoves and its reading rooms. He was one of the wardens of Trinity Church, that mistress of mighty revenues. He was for some years one of the governors of the New York Hospital, and I remember when he made periodical visits to the Insane Asylum at Bloomingdale, as one invested with authority there. During the existence of the Public School Society, he was one of its trustees from 1834 to 1841, and rendered essential service to the cause of public education.

His useful life closed on the 18th of March last. For some months before this date his strength had declined, and when I met him from time to time it seemed to me that his features had become sharper and his frame more attenuated, yet I perceived no diminution of mental vigor. He took the same interest in the events and questions of the day as he had done years before; his apprehension seemed as quick, and all the powers of his mind as active.

On the Wednesday before his death he attended one of those weekly meetings which he took care never to miss, that of the Commissioners of Emigration. But in one of his walks on a rainy day he had taken a cold which resulted in a congestion of the lungs. On Thursday evening he lay upon a sofa, conversing from time to time, after his usual manner, until near midnight. On Friday morning, when his body servant entered the room and looked at him he perceived a change and called his grandson, who, with a grand-daughter, had constantly attended him during the past winter. The grandson immediately went for his physician, Dr. Carnochan, who, however, was not to be found, and whose assistant, a young man, came in his stead. Mr. Verplanck, in a way which was characteristic of him, studied the young man's face for a moment and then asked: "From what college were you graduated?" The reply was, "Paris;" on which Mr. Verplanck turned away as if it did not much please him, and in a moment afterward expired. He was spared the previous suffering which so many are called to endure. His son had visited him from time to time, and was with him the day before his death, yet the event was unexpected to all the family. His father, in his old age, had as suddenly passed away, having fallen dead by the wayside.

The private life of our friend was as beautiful as his public life was useful and beneficent. He took great interest in the education of his grandchildren; inquired into their studies, talked with them of the books they read, and sought with great success to make them fond of all good learning, directing their attention to all that was noble in literature and in art. His mind was a storehouse of facts in history and biography on which he drew for their entertainment, and upon occasion diversified the graver narratives with fairy tales and stories of wonder from the Arabian Nights. He made learning pleasant to them by taking them on Saturdays to places of amusement from which he contrived that they should return not only amused but instructed. In short, it seemed as if, in his solicitude for the education of his descendants, he sought to repay the cares bestowed upon his early youth by his grandfather of Stratford, of whom he said in his discourse, delivered at Amherst College, that his best education was bestowed by the more than paternal care of one of the wisest and most excellent sons of New England. Long after he was an old man he would make pleasant summer journeys with these young people, and look to their comfort and safety with the tenderest solicitude.

Christmas was merry Christmas at the old family mansion in Fishkill. He caused the day to be kept with many of the ancient usages, to the great satisfaction of the younger members of the household. He was fond of observing particular days and seasons, and marking them by some pleasant custom of historical significance, for with all the ancient customs and rites and pastimes pertaining to them he was as familiar as if they were matters of to-day. It distressed him even to tears when, last Christmas, he found that his health did not allow him to make the journey to Fishkill as usual. He made much of the birthdays of his grandchildren, and taught them to observe that of Shakespeare by adorning the dwelling with the flowers mentioned in those aërial verses of the Winter's Tale:

> "daffodils,
> That come before the swallow dares and take
> The winds of March with beauty; violets dim,
> But sweeter than the lids of Juno's eyes
> Or Cytherea's breath; pale primroses
> That die unmarried," etc., etc.

For many years past he had divided his time pretty equally between Fishkill and New York, visiting the homestead in the latter part of the week and returning in time to attend the weekly meetings of the Commissioners of Emigration. While in the country he was a great deal in the open air, superintending the patrimonial estate, which he managed with ability as a man of business, giving a careful attention, even to the minutest details. But he was most agreeably employed in his large and well stored library. Here were different editions of the Greek and Latin classics, some of them rare and enriched with sumptuous illustrations; thirty different ones of Horace and nearly as many of Virgil. With the Greek tragedians he was as familiar as with our own Shakespeare. In this library he wrote for the Crayon his entertaining paper on Garrick and his portrait, and his charming little volume entitled "Twelfth Night at the Century Club." Here also he wrote several papers respecting the true interpretation of certain passages in Virgil, which were published in the Evening Post. It is to be regretted that he did not collect and publish his literary papers, which would form a very agreeable miscellany. He seemed, however, almost indifferent to literary fame, and when he had once sent forth into the world an essay or a treatise, left it to its fate as an affair which was now off his hands. On Sunday morning he was always at the old church in the village of Fishkill, one of the most attentive and devout worshipers there. It is an ancient building of homely architecture, looking now just as it did a century ago, with a big old pulpit and sounding board in the midst of the church, which the people would have been glad to remove, but refrained, because Mr. Verplanck, whom they so venerated, preferred that it should remain.

The patrimonial mansion at Fishkill had historical associations which must have added to the interest with which our friend regarded it. Mr. Tuckerman relates, in the North American Review, though without naming the place or the persons, a story in which they were brought out in a singular manner. He was there fifteen or twenty years since, a guest at Verplanck's table. He describes the June sunshine which played through the shifting branches of tall elms on the smooth oaken floor of the old dining room, the plate of antique pattern on the sideboard and the portraits of revolutionary heroes on the walls. As they sat down to dinner, an old lady, bowed with years and with a restless, yet serene look, entered and took a seat beside Mr. Verplanck. A servant adjusted a napkin under her chin, and the dinner proceeded. A steamer was passing up the river and a band on board struck up a martial air. The old lady trembled, clasped her hands, and, raising her eyes, exclaimed: "Ah! all intercession is vain. Andre must die." Mr. Verplanck made a sign to the company to listen, and calling the lady aunt, addressed her with some kind inquiry, on which she went on to speak of the events and personages of the revolution as matters of the present day. She repeated rapidly the names of the English officers whom she had known; "described her lofty head-dress of ostrich feathers, which caught fire at the theatre, and repeated the verses of her admirer who was so fortunate as to extinguish it." She dwelt upon the majestic bearing of Washington, the elegance of the French, the dogmatism of the British officers; the by-words, the names of gallants, belles and heroes; the incidents, the questions, the etiquette of those times seemed to live again in her tremulous accents, which gradually became feeble, until she fell asleep. "It was," continued the narrator, "like a voice from the grave." This old lady was a Miss Walton, a sister of Judge Verplanck's second wife.

When he found time for the studies by which his mind was kept so full of useful and curious knowledge, I cannot well conceive. He loved to protract an interesting conversation into the small hours of the night, and he was by no means, as it is said most long-lived men are, an early riser. An anecdote related by a gentleman of the New York bar will serve to illustrate, in some degree, his desultory habits during that part of his time which was passed in New York. This gentleman gave a dinner at Delmonico's then in William street, to a professional brother from another city, who was in town only for the day. Mr. Verplanck, Judge William Kent, and one or two other clever lawyers were of the party. I will allow him to tell the story in his own words:

"We, of course," he says, "had a delightful evening, for our stranger guest was a diamond; Kent was never more charming and witty, Mr. ——— never more stately and brilliant, and Verplanck was in his most genial mood, full of his peculiarly interesting, graceful and instructive conversations. The spirit of the hour was unrestrained and cordial. We had a good time, and it was not early when the dispersion began. Verplanck and Kent remained with us after the others withdrew, and as midnight approached Kent also departed. After awhile Verplanck and I went forth and sauntered along in the darkness, through the deserted streets, among the tenantless and gloomy houses, till we reached the point where his path would diverge for Broadway and up-town, and mine for Fulton Ferry and Brooklyn Heights. Instead of leaving me, the good philosopher volunteered to keep on with me to the river, and when we reached the river, proposed to remain with me until the boat arrived, and then proposed to cross the river with me. We were, I think, the only passengers, and his conversation continued to flow as fresh and interesting as at the dinner table, until we reached the Brooklyn shore. He declined to pass the rest of the night at my house, and while I waited with him till the boat should leave the wharf to take him back, the night editor of the Courier and Enquirer, a clever and accomplished gentleman, came on board on the way to his nocturnal labors. I introduced them to each other; they were at once in good accord; I saw them off and went homeward. A day or two after, I learned that when they reached the New York shore, Verplanck volunteered to stroll down to the Courier office with the editor, accepted his invitation to walk in, ascending with him to his room in the attic, and, to the editor's great delight and edification, remained with him, conversing, reading and ruminating until broad daylight. There was a charm in Mr. Verplanck's conversation that was distinctive and peculiar. It was 'green pastures and still waters.'"

Our friend had, it is true, a memory which faithfully retained the acquisitions made in early life, but, in some way or other, was continually enlarging them. I think I have never known one whose thoughts were so much with the past, whose memory was so familiar with the words and actions of those who inhabited the earth before us, and who so loved and reverenced the worthy examples they have given us, yet who so much interested himself in the present and was so hopeful of the future. There was no tendency of this shifting and changeful age which he did not observe; no new discovery made, no new theory started, no untrodden path of speculation opened to human thought, which did not immediately engage his attention, and of which he had not something instructive to say. He was as familiar with the literature of the day as are the crowd of common readers who know no other; yet he suffered not the brilliant novelties of the hour to wean his admiration from the authors whose reputation has stood the test of time. He was generous, however, to rising merit, and took pleasure in commending it to the attention of others.

His learning was not secular merely; his library was well stocked with works on theology; he was familiar with the questions discussed in them; the New Testament, in the original, was a part of his daily reading; he had examined the dark or doubtful passages of Scripture, and they who were much in his society needed no more satisfactory commentator. Not long since he sent to the Society Library for a theological work rather out of date. "It is the first time that work was ever called for," said the librarian, smiling, as he took it from the shelf, and aired the leaves a little.

His kindness to his fellow men was shown more in deeds than in words; for of words of compliment he was particularly sparing, and he loved to do good by stealth. A letter from his pastor, the Rev. Dr. Shelton, says: "He was very kind and affectionate when he thought he discovered merit in any body however humble, and though he dropped never so much as a hint to the individual himself, he was pretty sure to speak a good word for him in quarters where it would have an influence. A great many never knew whom they had to thank for this. Here he recommended some one for a place, there he picked up a book or a set of books for some distant library. In this way he went about doing good, and, not given to impulse, was systematically benevolent." A letter from another hand speaks of the clergymen whom he had put in the way of getting a parish, the youths for whom he had procured employment—favors quietly conferred, when perhaps the person benefited had forgotten the application or given up the pursuit. He preserved carefully all that related to those persons in whom he took a kindly interest. "Never," says Dr. Shelton, "did a juvenile letter come to him that he did not carefully put away. Whole packages of them are found among his papers; if they had been State documents they could not have been more important in his eyes."

I have spoken of the hopefulness of his temper. This was doubtless in a great degree constitutional, for he is said to have been an utter stranger to physical fear, preserving his calmness on occasions when others would be in a fever of alarm. He loved our free institutions, he had a serene and steady confidence in their duration, and his published writings are for the most part eloquent pleas for freedom, political equality and toleration. Even the shameless corruption which has seized on the local government of this city did not dismay or discourage him. He maintained, in a manner which it was not easy to controvert, that the great cities of Europe are quite as grossly misgoverned, and that every overgrown community like ours must find it a difficult task to rid itself of the official leeches that seek to fatten on its blood.

In looking back upon the public services of our friend it occurs to me that his life is the more to be held up as an example, inasmuch as, though possessed of an ample fortune, he occupied himself as diligently in gratuitous labors for the general good as other men do in the labors of their profession. In the dispensation of his income he leaned, perhaps, to the side of frugality, but his daily thought and employment were to make his fellow men happier and better; yet I never knew a man who made less parade of his philanthropy. He rarely, and never, save when the occasion required it, spoke of what he had done for others. I never heard, I think no man ever heard, anything like a boast proceed from his lips, nor did he practice any, even the most innocent expedients, to attract attention to his public services. Not that I suppose him insensible to the good will and good word of his fellow men. He valued them, doubtless, as every wise man must, but sought them not, except as they might be earned by the unostentatious performance of his duty. If they came they were welcome, if not, he was content with the testimony of his own conscience and the approval of Him who seeth in secret.

It may be said that in almost every instance the place of those who pass from the stage of life is readily supplied from among the multitude of those who are entering upon it; the well-graced actor who makes his exit is succeeded by another, who soon shows that he is as fully competent to perform the part as his predecessor. But when I look for one to supply the place of our friend who has departed, I confess I look in vain. I ask, but vainly, where we shall find one with such capacities for earning a great name, such large endowments of mind and acquisitions of study united with such modesty, disinterestedness and sincerity, and such steady and various labors for the good of our race conjoined with so little desire for the rewards which the world has to bestow on those who render it the highest services. But though we sorrow for his departure and see not how his honored place is to be filled, let us congratulate ourselves and the community in which we live, that he was spared to us so many years. His day was like one of the finest days in the season of the summer solstice, bright, unclouded and long.

Farewell, thou who hast already entered upon thy reward! happy in this, that thou wert not called from thy beneficent labors before the night. Thou hadst already garnered an ample harvest; the sickle was yet in thy hand; the newly reaped sheaves lay on the field at thy side, when, as the beams of the setting sun trembled on the horizon, the voice of the Master summoned thee to thine appointed rest. May all those who are as nobly endowed as thou, and who as willingly devote themselves to the service of God and mankind, be spared to the world as long as thou hast been.

The following are titles of other extended notices of Mr. Verplanck, which have appeared since his decease:

Proceedings of the Century Association in honor of the memory of Gulian C. Verplanck, April 9, 1870. New York, 1870. 8o; 100 pp. This volume includes the following, which has also been separately published:

Gulian C. Verplanck; His Ancestry, Life and Character. Delivered before the Century Club, April 9, 1870. By Charles P. Daly, LL.D. New York, 1870. 8o; 62 pp.

A Discourse on the Life and Services of the late Gulian C. Verplanck, LL.D. Delivered before the Numismatic and Antiquarian Society of Philadelphia, May 5, 1870. By Charles Henry Hart. * * New York, 1870; fo. 20 pp.

THE FORMATION OF CABINETS OF MINERALS FOR ACADEMIES, ETC., BY A PROPOSED SYSTEM OF EXCHANGES.

It will be seen, by reference to the foregoing minutes of the University Convocation held in August, 1870, that attention was called to this matter by Dr. F. B. Hough, a trustee of Lowville Academy, and that the subject was referred to a select committee and reported upon favorably. In the further discharge of their duties, the committee presented a memorial to the Legislature, during the session of 1871, setting forth the features of the plan, and accompanied by the draft of an act for the encouragement of the proposed system by providing for the necessary expenses. This memorial and bill were referred to the committee of ways and means in the Assembly. After some discussion, the committee agreed, during the last days of the session, to report the same to the house, and recommend the printing thereof as an Assembly document, which disposition of the matter, for the time being, was satisfactory to the memorialists.

The documents above referred to are republished herewith as a matter of general interest to the friends of academic education; also, the draft of a circular on the same subject, to be addressed to the officers of academies.

MEMORIAL.

To the Honorable the Legislature of the State of New York:

The undersigned would respectfully represent, that, at the meeting of the University Convocation of the State of New York, held in August, 1870, they were appointed a committee to take into consideration such measures as might be deemed effectual for promoting the study of the natural sciences, and especially of geology and mineralogy in the various academies of the State, under the visitation of the Regents of the University, by encouraging the formation of classes in these sciences, and by instituting a systematic exchange of specimens, and the formation of cabinets in such institutions as might express a willingness to co-operate in the measure, and engage to provide at their own cost suitable cases for their preservation.

To accomplish this result satisfactorily, it has been suggested that each of the academies or other institutions participating in the exchange, should collect in sufficient quantities specimens of metallic ores, rock formations, minerals and fossils in their vicinity, according to an arrangement to be previously made (thus avoiding duplicates of the same species from different localities), and that the specimens thus collected be sent to a central place and there assorted, labeled and packed in suites (each of which would include at least one of each kind), to be returned to the academies, with a carefully prepared catalogue and perfectly authentic labels.

Of the two hundred or more academies and higher institutions of learning in the State, your memorialists believe that a large number would willingly take part in the exchange, and incur the labor and expense of collecting specimens and of providing cases for such cabinets; and that others might reasonably be expected to join in the enterprise when the result might better become known.

Scattered as these institutions are, over every part of the State, and having within reach of each one of them materials for illustrating, to more or less extent, some feature of mineralogical or other scientific interest, it cannot be doubted but that contributions from each one, or from any considerable number of them, would possess extraordinary interest, and that the acquisition of such collections by our academies would do much toward stimulating the youth attending them to those habits of observation and inquiry, and to that love of science which it is the duty of our seminaries to impart, and which become to the possessors a source of lasting enjoyment and profitable use.

The value of a practical familiarity with the appearance, composition and economical uses of metallic ores and minerals, and of a correct knowledge of the characteristic features, whether of structure or organic remains, which distinguish the several rock formations, is too obvious for need of argument. It is, however, worthy of remark, that a knowledge of what is *not* of value in our mineral products, may often prove of the greatest service, by guarding against inconsiderate investments, where a little acquaintance with the true value of an ore or mineral would prevent such waste of money. In like manner, a practiced eye might detect value in a product which would be passed unnoticed by the casual observer. Both of these statements, and especially the former, have been too often illustrated in the history of our State, in which large sums have been wasted in searching for ores, coal and other minerals, in rocks where a person acquainted with geology, though but slightly, would have never spent a dollar; or in erecting costly furnaces for reducing ores which any mineralogist would have told beforehand, could never be worked with profit.

The interest which the collecting of specimens for the proposed exchange would excite in the classes engaged in making them, would be enhanced in receiving the returns which the exchange would bring, and in the opportunities for study and comparison which they would afford.

Your memorialists would respectfully represent that the State of New York, which has so nobly provided the means of education for every grade of its citizens, by planting and promoting institutions of learning in every section, and by placing the means for acquiring knowledge within the easy reach of all classes, might find it consistent with that liberal policy which has hitherto distinguished its measures, to encourage this system of exchange by relieving it of the expenses incident to the transportation, classification, labeling and return of the collections, and to the preparation of the descriptive catalogue which would so greatly enhance its value, by securing the result against errors from mistaken labels or imperfect descriptions.

It is presumed that the institutions uniting in the exchange would engage its classes to devote their leisure days as opportunities offered in the collection and packing of specimens in readiness for sending, and that the cost of specimens would be only that of transportation, the amount of which would not be large, and the expense of which would, when once paid, not be liable to again recur. The collections might be further enhanced in value without materially increasing the cost, by including some of the ores and minerals as they occur in the markets, as material for manufactures or for use in the arts, which might be purchased at their commercial value.

There is one consideration in connection with this proposed measure, which your memorialists regard as of the greatest importance, which would, if neglected, deprive the collections of their greatest value, and which cannot be carried into effect, unless provided for by competent authority. We refer to the preparation of a descriptive catalogue, in which, by reference from the specimens, might be found correctly stated the name and synonyms of the article, its economical uses or relative value (if employed in the arts), its distinguishing characteristics, geographical distribution, geological range and associations, chemical properties, and such other information as might be deemed of value.

The preparation of such a catalogue could not be effected in the common course of exchange, however extensive, and would never be attempted but in the manner we recommend. Your memorialists would, therefore, pray your honorable body to take such action in the premises as may be deemed best calculated to promote the diffusion of knowleged through the means herein mentioned, by providing, under suitable regulations, for defraying the expenses of transportation, labeling and the preparation of a catalogue, which a realization of the measures herein recommended would involve.

Respectfully submitted,

FRANKLIN B. HOUGH,
JAMES HALL,
E. J. HAMILTON,
J. DORMAN STEELE,
F. G. SNOOK,
Committee.

DRAFT OF

AN ACT to encourage the study of the Natural Sciences, and especially of Geology and Mineralogy in the Normal and Union Schools and Academies of the State.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Normal and Union Schools and Academies of the State are hereby authorized to send to the State Museum of Natural History at Albany, such specimens of ores, rocks, fossils and minerals, or other objects of natural history, as may be collected by them in their vicinity, or which they may otherwise acquire, properly indicating the localities from which the same were obtained.

§ 2. Such specimens shall be correctly designated, labeled, arranged in collections and catalogued by or under the supervision of the director of the State Museum. From these collections returns shall be made to the several institutious from which contributions may have been received, proportionate as nearly as may be to such contributions.

§ 3. The director of the State Museum shall, under the direction of the Regents of the University, select from the collections of ores, rocks, fossils and minerals belonging to the museum aforesaid, any duplicate specimens which can be spared without detriment to the public collections, and shall properly designate and label the same, catalogue and arrange in collections, and make distribution thereof to the normal and union schools and academies of the State and to such other institutions as may be designated by the Regents of the University, which shall have certified to the Board of Regents that suitable provision has been made by them for the safe keeping and exhibition of said collections.

§ 4. For the expenses of transportation of specimens to and from the State Museum, for their labeling, cataloguing, packing, and for all other expenses incident to this act, the sum of two thousand dollars annually shall be and is hereby appropriated.

§ 5. This act shall take effect immediately.

CIRCULAR.

ALBANY, *August 3d*, 1870.

To the Principal of the ....

SIR.—The undersigned were appointed, at the recent session of the University Convocation of the State of New York, a committee to arrange a plan for the formation of geological and mineral cabinets, in academies of this State, by mutual exchange.

The proposition submitted is as follows:

1. That the several institutions, under the visitation of the Regents of the University, be invited to make collections of one or two hundred specimens of a kind (to be hereafter designated), that may be found in their vicinity.

2. That these collections of duplicates shall be sent to the State Cabinet, at Albany, where they will be distributed into suites, each of which shall contain a representation of the whole. These cabinets to be carefully labelled, and returned to each institution participating in the exchange, with a descriptive catalogue particularly stating the locality, name of collector or institution sending, geographical and geological distribution, scientific characters and economical uses.

3. That the Legislature be solicited to provide the means for defraying the cost of transportation to and from Albany, and the cost of labels and catalogue.

4. That the collections to be formed shall be the property of the institutions to which they may be sent, and that the trustees or other responsible persons shall engage to provide suitable glass cases for their preservation.

Particular directions will hereafter be issued for the collection and packing of specimens, and suitable care will be taken that the cabinets shall embrace as complete a series of the geological formations and mineral resources of the State, as can be found by these means, or otherwise, without duplicates or needless varieties.

You are respectfully requested, after due consultation, to inform the secretary of the Board of Regents, whether your institution will undertake an exchange upon the above basis. If accepted, you will please to designate any metallic ores, minerals or fossils that may be known to exist in your vicinity, which may be obtained in suitable quantities for this purpose. Any suggestions that you may deem it proper to offer, will also be respectfully received.

(Signed) FRANKLIN B. HOUGH, Lowville, N. Y.
JAMES HALL, Albany, N. Y.
FRANCIS G. SNOOK, Monticello, N. Y.
J. DORMAN STEELE, Elmira, N. Y.
EMERSON J. HAMILTON, Oswego, N. Y.
Committee.

A NEW METHOD OF SOLVING CUBICS AND TRINOMIAL EQUATIONS OF ALL DEGREES.

By E. W. Evans, M. A.,
Professor of Mathematics in the Cornell University.

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1. In the *Mathematical Monthly* for August, 1860, I published, in elementary form, a method of my own for solving cubic equations. Having failed to find any thing of the same character elsewhere, I venture still to claim it as new. I have since developed it more fully, and applied it to trinomial equations in general. For this class it seems to me more simple and expeditious than any of the approximative methods in use. The first step consists in finding x equal to an expression which involves x, and which is of such a form that it may be expanded by being substituted in itself. This class of functions I will designate as *self-expanding*. The expansion assumes some form, either of continued fraction or of continued surd.

2. The solution of the equation of the third degree, after the second term has been made to disappear, may be reduced to the two following cases:

$$x^3-ax-b=0, \ (1),$$
$$x^3+ax-b=0, \ (2),$$

for the roots of $x^3-ax+b=0$, (3), being numerically the same with those of (1), though of contrary signs, we may, for the purpose of numerical solution, change it to (1); and, for the same reason, we may change $x^3+ax+b=0$, (4), to the form (2).

Solution of $x^3-ax-b=0$.

3. One root of this equation is always positive; the two others may be both negative or both imaginary. I propose, first, to find the positive root.

The equation may be put in the form $x=\pm\sqrt{a+\frac{b}{x}}$. Now, by substituting for x, in the second member, its value, namely, the second member itself, and repeating the substitution, we obtain

Formula I. $$x = \pm\sqrt{a + \cfrac{b}{\pm\sqrt{a + \cfrac{b}{\pm\sqrt{a + \frac{b}{s}}}}}}$$

where s represents the indefinite continuation of the series.

4. To find the positive root numerically, take a few of the terms of this continued fraction, and, beginning with the last, divide b by some near limit, r, of this root, add a to the quotient, extract the square root of the sum, by which, taken with the positive sign, divide b again, and continue the same process upward. The values, r', r'', r''', etc., obtained for the successive radicals, will be nearer and nearer approximations to x; and the root can thus be found correctly to any required number of places.

5. In the solution of the following examples, I shall generally take r equal either to the first significant figure of the root (regard being had to its decimal place), or to the next figure above, or to the arithmetical mean between the two. I will perform the work by means of logarithms, and preserve it entire, in order to show better the character and extent of it. In the first few steps of each solution, rapidity will be sought rather than exactness.

6. Ex. 1. $x^3 - 8x - 5 = 0$. Root between 3 and 4; take $r = 3$.

$$x = \sqrt{8 + \cfrac{5}{\sqrt{8 + \frac{5}{s}}}}$$

5 - - - -	0.698970	
9.6 - - -	0.982271 (2	
	0.491135 - -	r'
	0.207835 - -	1.613
9.613 - - -	0.982859 (2	
	0.491429 - -	r''
	0.207541 - -	1.6126
9.6126 - -	0.982841 (2	
	0.491420 - -	r'''
	0.207550 - -	1.61268
9.61268 - -	0.982844 (2	
	0.491422 - -	$r^{iv} = 3.10042$ - - $= x$.

Here the fourth approximation gives the root correctly to six places. If it is required further, the rest of the work can be performed by natural numbers.

7. It would be easy to show that we might have arrived at $+x$ without a very long process from either of the extreme limits, $r = \infty$ or $r = -\frac{b}{a}$. But since we propose only to aproximate from a near limit, of the same sign as the root, it is more important to find some simple method, of general application, by which we may judge whether a given formula of this class will converge finally to x.

In the operation, we have converted the constant function, $x = \pm\sqrt{a + \frac{b}{x}}$, of which the formula is an expansion, into a variable function, $r' = \pm\sqrt{a + \frac{b}{r}}$; for the second step, $r'' = \pm\sqrt{a + \frac{b}{r'}}$, is but a repetition of the first, r' being now a new value of r, and r'' a new value of r'; and so of the subsequent steps. This variable function becomes identical with the constant function when $r' = r$; in other words, the variables r' and r pass through the value x simultaneously. It is evident, then, that the formula will converge to x, from a near limit, if r' departs from x less rapidly than r, when r varies continuously. This condition will be fulfilled if $\frac{dr'}{dr}$ is numerically less than unity when r and r' pass through x. Now, $\frac{dr'}{dr} = -\frac{b}{2r'r^2}$, which, when r and r' pass through x, is $-\frac{b}{2x^3}$. This last fraction, then, may be called the *index of convergence* for Formula I. It will be designated thus, $\left(\frac{dr'}{dr}\right)$.

8. In the equation, $x^3 - ax - b = 0$, we see that x^3, when x is positive, is greater than b; hence $-\frac{b}{2x^3}$ is less than unity, and Formula I will always converge to this root.

9. The negative sign of the index shows that, if r increase from $+x$, r' will decrease from $+x$, and *vice versa*; hence the successive approximations will alternate from one side to the other of the root. To as many places, then, as the result is the same for any two successive approximations, for instance, r''' and r^{iv}, it is to be taken as the true root.

It is evident that the right hand marginal numbers in the solution will also be alternately too large and too small. Each of these should in general be carried out only to one or two places further than it agrees with the preceding one, and, when the number is too small, the last figure should be taken from the superior column in the tables.

10. If b in equation (1) remain constant, the greater a is the greater must $+x$ be, and the greater consequently is the excess of $2x^2$ over b. Hence it is a condition favorable to rapid approximation to $+x$, by Formula I, that a be large in comparison with b.

Ex. 2 $x^2 - 210x + 8 = 0$. This being of the form (3), we first change it to (1), or $x^2 - 210x - 8 = 0$. Root of last, between 10 and 20; take $r = 15$.

$$x = \sqrt{210 + \frac{8}{\sqrt{210 + \frac{8}{s}}}}$$

$$\begin{array}{llll}
8 & \text{- - -} & \underline{0.903090} & \\
210.5 & \text{- - -} & 2.323252\,(2 & \\
 & & \underline{1.161626} & \text{- -}\ \ r' \\
 & & \bar{1}.741464 & \text{- -}\ \ .551 \\
210.551 & \text{- -} & 2.323337\,(2 & \\
 & & 1.161678 & \text{- -}\ \ r'' = 14.5103 \ \text{- -} = x.
\end{array}$$

Hence, in the original equation, $x = -14.5103$.

11. For the case where b is large in comparison with a, there is another self-expanding formula which will converge much more rapidly to $+x$. Equation (1) may be put in the form, $x = \sqrt[3]{b + ax}$; from which, by substituting the second member in itself, we obtain

$$\text{Formula II.}\quad x = \sqrt[3]{b + a\sqrt[3]{b + a\sqrt[3]{b + as}}}.$$

The process of finding the root by this formula will be entirely analogous to that used for the preceding; that is, multiply r by a, add b to the product, extract the cube root of the sum, multiply this by a again, and so on.

12. Ex. 3. $x^3 - 4x - 85 = 0$. Root between 4 and 5; take $2 = 4.5$.

$$x = \sqrt[3]{85 + 4\sqrt[3]{85 + 4s}}$$

4	- - -	0.602060		
103	- - -	2.012837 (3		
		0.670945	- -	r'
		1.273005	- -	18.75
103.75	- -	2.015988 (3		
		0.671996	- -	r''
		1.274056	- -	18.79
103.79	- -	2.016156 (3		
		0.672052	- -	$r''' = 4.6995$ - - $= x$.

13. From $r' = \sqrt[3]{b + ar}$ we get $\frac{dr'}{dr} = \frac{a}{3r'^2}$, which, when r and r' pass through x, is $\frac{a}{3x^2}$. The last fraction, then, is the index of convergence for Formula II. Now, in equation (1), put in the form $x\,(x^2 - a) = b$, we see that when x is positive $x^2 > a$; hence $\frac{a}{3x^2}$ is less than unity, and formula II will always converge to $+\,x$ from a near limit. But, if a remain constant and b increase, $+\,x$ must also increase, and there will consequently be an increased rate of final convergence.

By comparing the two indices $-\frac{b}{2x^3}$ and $\frac{a}{3x^2}$ we can judge whether I or II will converge most rapidly to a root between known limits. Thus, in the last example, the root being between 4 and 5, $3x^2$ will exceed a proportionally more than $2x^3$ will exceed b; hence the final convergence will be most rapid by II.

14. The index for II being positive, we may infer that the approximations will be, not alternating as before, but progressive from one side; that is, either continually decreasing from a superior limit, or continually increasing from an inferior one. In this and in other cases we shall know that we have carried the work far enough when we find the logarithms of two successive approximations so nearly equal as to give the same result.

15. Having found the positive root of (1), we may complete the solution by depressing the equation to a quadratic; or we may find the other roots, when real, by the formulas already used.

Ex. 4. $x^3 - 6x - 2 = 0$. The positive root may be found, as in article 6, to be 2.60167 - - .

There is a root between —2 and —3. Any number between these limits, substituted for x, will render $-\frac{b}{2x^3}$ less than unity; hence Formula I will converge to this root. Take $r=-2$.

$$x=-\sqrt{6+\frac{2}{-\sqrt{6+\frac{2}{s}}}}$$

$$\begin{array}{lll}
2\ \text{- - - - -} & 0.301030 & \\
\hline
5\ \text{- - - - -} & 0.698970\ (2 & \\
 & 0.349485 & \text{- -}\ r' \\
\hline
 & \bar{1}.951545 & \text{- -}\ .89 \\
5.11\ \text{- - -} & 0.708421\ (2 & \\
 & 0.354210 & \text{- -}\ r'' \\
\hline
 & \bar{1}.946820 & \text{- -}\ .8847 \\
5.1153\ \text{- -} & 0.708872\ (2 & \\
 & 0.354436 & \text{- -}\ r''' \\
\hline
 & \bar{1}.946594 & \text{- -}\ .8842 \\
5.1158\ \text{- -} & 0.708914\ (2 & \\
 & 0.354457 & \text{- -}\ r^{\text{iv}}=-2.2618\ \text{- -}\ =x.
\end{array}$$

It is evident that x, when negative, cannot be so small numerically as to render the quantity under the radical negative. This gives us —.333 - - as an inferior limit of the negative roots.

16. The third root is between —.3 and —.4. Now a value of x between these limits will render the index of I greater than unity; hence the formula will diverge from this root, if used in the same manner as before. But, if it diverges when we begin with the last term and proceed upward, it must converge when we reverse the whole operation, that is, begin with the first term and proceed downward. In the latter case $r=-\sqrt{6+\frac{2}{r'}}$. Hence, to find r', we must square r, subtract 6 from the result, and divide 2 by the remainder. By continuing the process, we shall in the same manner find r'', r''', etc. Take $r=-.4$.

$$\begin{array}{llll}
2 \;-\;-\;-\;- & 0.301030 & & \\
\cline{2-2}
-5.84 \;-\;-\;- & 0.766413 & & \\
 & \bar{1}.534617 & \underline{|\times 2} \;-\;- & r' \\
\cline{2-2}
 & \bar{1}.069234 & \;-\;-\;- & .117 \\
-5.883 \;-\;- & 0.769599 & & \\
 & \bar{1}.531431 & \underline{|\times 2} \;-\;- & r'' \\
\cline{2-2}
 & \bar{1}.062862 & \;-\;-\;- & .1155 \\
-5.8845 \;-\;- & 0.769710 & & \\
 & \bar{1}.531320 & \;-\;-\;- & r'' = -.33987 \;-\;- = x.
\end{array}$$

17. This second method of finding a value of a continued fraction (which I have not seen elsewhere) is applicable also to the continued surd. I will call it the *inverse process*, and the other the *direct*. Since r and r' merely exchange places, the condition of final convergence to a root by the inverse process is that this root shall render the index, as before found for the direct process, greater than unity.

18. Represent the two negative roots of (1) by x' and x'', and let the latter be numerically the greater. It is evident that the function $r' = -\sqrt{a + \frac{b}{r}}$ is continuous from 0 to $-\infty$; hence, while r varies continuously, r' cannot pass from one side to the other of a negative root without passing through it, and consequently also through r. Now a negative root renders the index $-\frac{b}{2x^2}$ positive. This shows that if r begin to increase from x', r' will also begin to increase from x'. Hence, as long as r is between x' and x'', r' must also be between them. Now. whichever of the variables at first increases the more rapidly from x', it is evident that, before they come together again at x'', the other must increase the more rapidly. Hence somewhere between $r = x'$ and $r = x''$, $\frac{dr'}{dr}$, or $-\frac{b}{2r'r^2}$, must be equal to unity. But r and r' are in this case both greater than x' and both less than x''. Hence $-\frac{b}{2x'^2} > 1$, and $-\frac{b}{2x''^2} < 1$. It follows that Formula I will converge to x' by the inverse process, and to x'' by the direct. The same may be proved, in like manner, of Formula II.

19. Again, it follows that, if we put the index of either formula equal to unity, the resulting negative value of x will

separate the two negative roots. In cases where they are quite near to each other, this expedient will be useful. Thus $x^3 - 7x - 7 = 0$ has two roots between -1 and -2. Hence their situation will not be discovered by a change of sign in passing, tentatively, from $x = -1$ to $x = -2$. But $-\frac{7}{2x^3} = 1$ gives -1.511 - - for a separating number, and $\frac{7}{3x^2} = 1$ gives -1.526 - -. Hence one root is between -1 and -1.511, and the other between -1.526 and -2. We can now easily find nearer limits; the former root is between -1.3 and -1.4, and the latter between -1.6 and -1.7. Formula I readily gives the positive root as 3.0489 - -. Owing to the small interval between the two negative roots in this example, the approximation to them by either formula will be slow, even from the limits last found. Further on, I will point out an expedient by which, in such cases, we can make the approximation rapid.

20. Thus far I have assumed that x' and x'' are unequal. It is known that, by varying the relative value of the constants, a and b, these two roots can be made to approach one another until they become equal, and finally become imaginary together. When they are equal, the separating number, found by either index, must itself be the double root. Hence the two separating numbers, $\sqrt[3]{\frac{-b}{2}}$ and $-\sqrt{\frac{a}{3}}$, must in this case be equal; nor can they be equal in any other case, for the equation $\sqrt[3]{\frac{-b}{2}} = -\sqrt{\frac{a}{3}}$ fixes the relative value of the constants. Hence we have a simple rule for determining the negative roots of (1) when they are equal; that is, if the two indices give the same separating number, that number is twice a root of the equation. Thus, for the example $x^3 - 3.63x - 2.662 = 0$, $-\frac{2.662}{2x^3} = 1$ gives $x = -1.1$, and $\frac{3.63}{3x^2} = 1$ also gives $x = -1.1$; hence -1.1 occurs twice as a root.

21. If the separating number for I is numerically greater than the separating number for II, the roots x' and x'' are imaginary. For putting $\sqrt[3]{\frac{b}{2}} > \sqrt{\frac{a}{3}}$, and raising both sides to the sixth power, we have $\frac{b^2}{4} > \frac{a^3}{27}$; which, by Sturm's Theorem, is the condition showing that two of the roots of (1) are imaginary.

22. Those classes of cubics which constitute the "irreducible case" of Cardan are comprehended under the two forms (1) and (3), which we have now solved. (Art. 2.)

By the same operations we might find the roots of (3) directly, instead of first reducing it to (1) by changing the signs of the alternate terms; the only object of this change being (as in other examples which follow) to avoid multiplying cases unnecessarily.

Solution of $x^3 + ax - b = 0$.

23. This equation has but one real root, and that always positive. It may be solved by I and II, with the sign of a changed, of course, in both formula and index.

Ex. 5. $x^3 + 7x - 5 = 0$. Root between .6 and .7. A number between these limits substituted in $-\dfrac{b}{2x^3}$ will render it greater than unity; hence I will converge in this case by the inverse process. Take $r = .7$.

$$x = \sqrt{-7 + \dfrac{5}{\sqrt{-7 + \dfrac{5}{s}}}}$$

$$\begin{array}{lllll}
5 & \cdots & 0.698970 & & \\
\cline{3-3}
7.49 & \cdots & 0.874482 & & \\
 & & \overline{1}.824488 & \underline{|\times 2} \;\cdot\cdot & r' \\
\cline{3-3}
 & & \overline{1}.648976 & \cdots & .446 \\
7.446 & \cdot\cdot & 0.871923 & & \\
 & & \overline{1}.827047 & \underline{|\times 2} \;\cdot\cdot & r'' \\
\cline{3-3}
 & & \overline{1}.654094 & \cdots & .4509 \\
7.4509 & \cdot\cdot & 0.872208 & & \\
 & & \overline{1}.826762 & \underline{|\times 2} \;\cdot\cdot & r''' \\
\cline{3-3}
 & & \overline{1}.653524 & \cdots & .4504 \\
7.4504 & \cdot\cdot & 0.872179 & & \\
 & & \overline{1}.826791 & \cdots & r^{\text{iv}} = .67110 \;\cdot\cdot = x.
\end{array}$$

23. Putting equation (2) in the form $x^3 + ax = b$, we see that if $ax > x^3$, $b > 2x^3$; and Formula I must under these conditions converge by the inverse process. But, if b remain constant and a increase, x must decrease; hence it is a condition favorable to rapid convergence, in this case, that a be large in comparison with b.

Ex. 6. $x^3 + 47x + 3 = 0$. This being of the form (4), we change it to (2), or $x^3 + 47x - 3 = 0$. Root of last between 0 and .1; take $r = .1$.

$$x = \sqrt{-47 + \frac{3}{\sqrt{-47 + \frac{3}{s}}}}$$

$$\begin{array}{llllll}
3 & \text{- - -} & 0.477121 & & & \\
\cline{3-3}
47.1 & \text{- - -} & 1.673021 & & & \\
 & & \bar{2}.804100 \mid \underline{\times 2} & \text{- -} & r' & \\
\cline{3-3}
 & & \bar{3}.608200 & \text{- - -} & .00405 & \\
47.004 & \text{- -} & 1.672135 & & & \\
 & & \bar{2}.804986 & \text{- - -} & r'' = .06382 & \text{- -} = x.
\end{array}$$

Hence in the first equation $x = -.06382$.

24. Again we see that if $ax < x^3$, $a < x^2$; still more $a < 3x^2$; hence II will converge in this case by the direct process, and it may be shown, as before, that it will converge most rapidly when b is large in comparison with a.

Ex. 7. $x^3 + 25x - 360 = 0$. Root between 5 and 6; take $r = 6$.

$$x = \sqrt[3]{360 - 25\sqrt[3]{360 - 25s}}$$

$$\begin{array}{llllll}
25 & \text{- - -} & 1.397940 & & & \\
\cline{3-3}
210 & \text{- - -} & 2.322219\,(3 & & & \\
 & & 0.774073 & \text{- -} & r' & \\
\cline{3-3}
 & & 2.172013 & \text{- -} & 148.6 & \\
211.4 & \text{- -} & 2.325105\,(3 & & & \\
 & & 0.775035 & \text{- -} & r'' & \\
\cline{3-3}
 & & 2.172975 & \text{- -} & 148.9 & \\
211.1 & \text{- -} & 2.324488\,(3 & & & \\
 & & 0.774829 & \text{- -} & r''' & \\
\cline{3-3}
 & & 2.172769 & \text{- -} & 148.86 & \\
211.14 & \text{- -} & 2.324570\,(3 & & & \\
 & & 0.774856 & \text{- -} & r^{\text{iv}} = 5.9546 & \text{- -} = x.
\end{array}$$

25. When the opposite condition exists, that is, when a is large in comparison with b, II will converge rapidly by the inverse process.

Ex. 8. $x^3 + 5.2x - .7 = 0$. Root between .1 and .2; take $r = .15$.

$$x = \sqrt[3]{.7 - 5.2\sqrt[3]{.7 - 5.2s}}$$

$$\begin{array}{llllll}
5.2 & \text{- - -} & 0.716003 & & & \\
\cline{3-3}
.15\,(r) & \text{- -} & \bar{1}.176091 & |\underline{\times 3} & & \\
\cline{3-3}
 & & \bar{3}.528273 & & \text{- - -} & .00337 \\
.69663 & \text{- -} & \bar{1}.843001 & & & \\
 & & \bar{1}.126998 & |\underline{\times 3} & \text{- -} & r' \\
\cline{3-3}
 & & \bar{3}.380994 & & \text{- - -} & .002405 \\
.69759 & \text{- -} & \bar{1}.843599 & & & \\
 & & \bar{1}.127596 & & \text{- -} & r'' = .13415 \;\text{- -}\; = x.
\end{array}$$

For a method of obviating cases of slow approximation, such as arise, for instance, when ax is not far from equal to x^3, the reader is referred to articles 38 and 39.

Solution of Cubics in other Trinomial Forms.

26. The equation $x^3 - ax^2 - b = 0$, to which form equation (2) is reduced by the reciprocal transformation, may be put in the form $x = a + \frac{b}{x^2}$; from which, by substituting for x^2 in the second member its value, namely, the square of the second member itself, we obtain

$$\text{Formula III.} \quad x = a + \cfrac{b}{\cfrac{(a+b)^2}{\cfrac{(a+b)^2}{s^2}}}$$

From $r' = a + \frac{b}{r^2}$ we have $\left(\frac{dr'}{dr}\right) = -\frac{2b}{x^3}$.

Ex. 9. $x^3 - 3x^2 - .25 = 0$. Root between 3 and 4. Take $r = 3$. We see, by inspection of the index, that there will be rapid convergence by the direct process.

$$x = 3 + \cfrac{.25}{\cfrac{(3+.25)^2}{s^2}}$$

$$\begin{array}{lllll}
.25 & \text{- - - -} & \bar{1}.397940 & & \\
\cline{3-3}
3.027\,(r') & \text{- -} & 0.481012 & |\underline{\times 2} & \\
\cline{3-3}
 & & 0.962024 & & \\
 & & \bar{2}.435916 & \text{- -} & .02728 \\
\multicolumn{3}{l}{3.02728\,(r'') = x.} & &
\end{array}$$

27. The equation $x^3 + ax^2 - b = 0$, to which form equation (1) is reduced by the reciprocal transformation, may also be solved by the last formula, modified as to the sign of a.

Ex. 10. $x^3 + 22x^2 - 24 = 0$. There is a root between 1 and 2; take $r = 1$. We see by the index that III will converge to this root by the inverse process.

$$x = -22 + \cfrac{24}{\left(-22 + \cfrac{24}{8^2}\right)^2}$$

24 - - -	1.380211	
23 - - -	1.361728	
	0.018483 (2	
	0.009241 - -	$r' = 1.0215$
23.0215 - -	1.362133	
	0.018078 (2	
	0.009039 - -	$r'' = 1.02103$ - - $= x$.

28. There is a negative root between -1 and -2; take $r = -1$. Convergence again by the inverse process.

24 - - -	1.380211	
21 - - -	1.322219	
	0.057992 (2	
	0.028996 - -	$r' = -1.069$
20.931 - -	1.320790	
	0.059421 (2	
	0.029710 - -	$r'' = -1.071$
20.929 - -	1.320748	
	0.059463 (2	
	0.029731 - -	$r''' = -1.0708$ - - $= x$.

The other root is between -20 and -30. From $r = -20$, Formula III gives, by the direct process, $r'' = -21.9501$ - - $= x$.

29. The solution of $x^3 - ax^2 - b = 0$ of course includes that of $x^3 + ax^2 + b = 0$, which is reduced to it by changing signs of alternate terms; also the solution of $x^3 + ax^2 - b = 0$ includes that of $x^3 - ax^2 + b = 0$.

30. For these forms there is also another formula which sometimes, as will be found by comparison of the two indices, will converge more rapidly than III.

Putting $x^3 - ax^2 - b = 0$ in the form $x = \sqrt[3]{b + ax^2}$, and substituting for x^2 in the second member its value, namely, the square of the second member itself, we obtain

Formula IV. $x = \sqrt[3]{b + a\sqrt[\frac{2}{3}]{b + a\sqrt[\frac{2}{3}]{b + as^2}}}$

From $r' = \sqrt[3]{b + ar^2}$ we have $\left(\frac{dr'}{dr}\right) = \frac{2a}{3x}$.

31. Ex. 11. $x^3 - .0375x^2 - .0125 = 0$. Root between .2 and .3; take $r = .25$. The index shows that there will be convergence in this case by the direct process.

$$x = \sqrt[3]{.0125 + .0375\sqrt[\frac{2}{3}]{.0125 + .0375s^2}}$$

.0375	- -	$\bar{2}.574031$		
.25 (r)	- -	$\bar{1}.397940$	$\times 2$	
		$\bar{2}.795880$		
		$\bar{3}.369911$	- -	.0023
.0148	- -	$\bar{2}.170262$	(3	
		$\bar{1}.390087$	$\times 2$	- r'
		$\bar{2}.780174$		
		$\bar{3}.369911$	- -	.00226
.01476	- -	$\bar{2}.169086$	(3	
		$\bar{1}.389695$	$\times 2$	- r''
		$\bar{2}.779390$		
		$\bar{3}.353421$	- -	.002256
.014756	- -	$\bar{2}.168969$	(3	
		$\bar{1}.389656$	- -	$r''' = .24527$ - - $= x$.

Solution of Trinomial Equations in General.

32. We will now apply the preceding formulas, generalized, to the solution of trinomial equations of higher degrees than the third.

The trinomial equation of the m^{th} degree, $x^m - ax^n - b = 0$, may be put in the form $x = \sqrt[m-n]{a + \frac{b}{x^n}}$; from which, by substituting for x^n in the second member its value, namely, the n^{th} power of the second member itself, we obtain

Formula A. $$x = \left(a + \cfrac{b}{\left(a + \cfrac{b}{\left(a + \cfrac{b}{s^n}\right)^{\frac{n}{m-n}}}\right)^{\frac{n}{m-n}}}\right)^{\frac{1}{m-n}}$$

From $r' = \sqrt[m-n]{a + \frac{b}{r^n}}$ we have $\left(\frac{dr'}{dr}\right) = -\frac{bn}{(m-n)x^m}$.

This formula includes I and III.

33. Again, the equation can be put in the form $x = \sqrt[m]{b + ax^n}$; from which, in the same manner, we obtain

Formula B. $$x = \sqrt[m]{b + a\,\sqrt[\frac{n}{m}]{b + a\,\sqrt[\frac{n}{m}]{b + as^n}}}.$$

From $r' = \sqrt[m]{b + ar^n}$ we have $\left(\frac{dr'}{dr}\right) = \frac{an}{mx^{m-n}}$.

This formula includes II and IV.

When the sign of a or b is positive in the original equation, it must be changed, of course, in the above two formulas and in their indices.

34. Ex. 12. $x^4 + 2x - 7 = 0$, or, changing signs of alternate terms, $x^4 - 2x - 7 = 0$.

By B, $x = \sqrt[4]{7 + 2\sqrt[4]{7 + 2s}}$. $\frac{dr'}{dr} = \frac{1}{2x^3}$.

There is one root between 1 and 2. This will render the index positive and less than unity. Hence there will be convergence by the direct process, and it will be progressive. (Art. 14.) Take $r = 2$.

2 - - -	0.301030	
11 - - -	1.041393 (4	
	0.260348 - -	r'
	0.561378 - -	3.642
10.642 - -	1.026942 (4	
	0.256735 - -	r''
	0.557765 - -	3.612
10.612 - -	1.025797 (4	
	0.256449 - -	r'''
	0.557469 - -	3.609
10.609 - -	1.025673 (4	
	0.256418 - -	$r^{\text{iv}} = 1.8027$ - - $= x$.

There is also a root between — 1 and — 2; and B gives, by the direct process, $r^{\text{iv}} = -1.5445 \cdots = x$.

35. Ex. 13. $x^5 + 7x^4 + 9 = 0$, or, after changing signs of alternate terms, $x^5 - 7x^4 - 9 = 0$.

By A, $x = 7 + \cfrac{9}{\left(7 + \cfrac{9}{s^4}\right)^4}$. $\left(\dfrac{dr'}{dr}\right) = -\dfrac{36}{x^5}$.

Root of last between 7 and 8; convergence by the direct process; take $r = 7$.

$9 \ \text{- - - - - -} \ 0.954243$

$7\ (r) \ \text{- - - -} \ \underline{0.845098} \mid \underline{\times 4}$

3.380392

$\bar{3}.573851 \ \text{- -} \ .0037$

$7.0037\ (r') \ \text{- -} \ 0.845327 \mid \underline{\times 4}$

3.381308

$\bar{3}.572935 \ \text{- -} \ .00373$

$7.00373\ (r'') = x$.

36. Ex. 14. $x^5 - 7x^2 + 1 = 0$.

By B, $x = \sqrt[5]{-1 + 7\sqrt[\frac{2}{5}]{-1 + 7s^2}}$. $\left(\dfrac{dr'}{dr}\right) = \dfrac{14}{5x^3}$.

There is a root between — .3 and — .4. This will render the index negative and greater than unity. Hence the approximation will be alternating (Art. 9), and by the inverse process. Take $r = -.4$.

$7 \ \text{- - - -} \ 0.845098$

$-.4\ (r) \ \text{- - -} \ \underline{\bar{1}.602060} \mid \underline{\times 5}$

$\bar{2}.010300 \ \text{- - - -} \ -.0102$

$.9898 \ \text{- -} \ \bar{1}.995547$

$\bar{1}.150449\ (2$

$\bar{1}.575224 \mid \underline{\times 5} \ \text{- -} \ r'$

$\bar{3}.876120 \ \text{- - - -} \ -.00752$

$.99248 \ \text{- -} \ \bar{1}.996722$

$\bar{1}.151624\ (2$

$\bar{1}.575812 \ \text{- - -} \ r'' = -.37654 = x$.

There is also a root between .3 and .4. From $r = .4$, B gives, by the inverse process again, $r'' = .3794 \cdots = x$.

37. There is another real root between 1 and 2, but much nearer 2. The index shows that, if we proceed as heretofore, the convergence to this root will be very slow. By A it would be rapid; but I will take this case for showing an expedient by which it can be made rapid without changing formula. The approximation will be progressive, and by the direct process. Take $r = 2$.

7	- - -	0.845098			28	
27	- - -	1.431364	(5			
		0.286272	× 2			
		0.572544				
		1.417642		- -	26.16	1.84
23.32	- -	1.367729	(5		—1.84	
		0.273545	× 2		24.32	
		0.547090				
		1.392188		- -	24.68	.36
23.86	- -	1.377670	(5		+.18	
		0.275534	× 2		24.86	
		0.551068				
		1.396166		- -	24.90	.04
23.92	- -	1.378761	(5		+.02	
		0.275752	× 2		24.92	
		0.551504				
		1.396602		- -	24.923	.003
23.924	- -	1.378834			+.001	
					24.924	
		0.275767		- -	$r^{v} = 1.8869$	- - $= x$

38. By the method just used we can obviate all cases of slow approximation to a root which renders the index positive. In such cases, if r is a superior limit, the series r, r'', etc., is a decreasing one; if r is an inferior limit, the series is an increasing one. Now, when the convergence of this series is slow, that of the series of right hand marginal numbers must also be slow. We will, therefore, compare the first marginal number, or that derived directly from r (28 in the above solution), with the second, or that derived from r'; and, if the latter is the less, we will diminish it by once the difference between the two; if it is the greater, we will increase it by once that difference. If, as

above, the change thus made is too great, so that we pass to the other side of the root, the fact will become manifest in the next marginal number by a change in the direction of approximation, that is, from decreasing to increasing, or *vice versa*. From that point on we will use in the same manner the half differences in comparing the second marginal number as changed with the third as found, the third with the fourth, etc. If we pass the root again, we will, after that, use one-third the differences. If we do not pass the root in applying once the difference, we will at the next step apply twice the difference, and at the next three times the difference, and so on, increasing our multiplier by one at each step, until we pass the root; from that point on we will proceed with the last multiplier diminished by one, or, if in so doing we pass the root again, we will again diminish the multiplier by one.

39. When the root is between such limits as to render the index negative, the right hand marginal numbers will be alternately too great and too small. When the index shows a slow rate of convergence, we may assume that the second marginal number is not much nearer to correctness than the first. Hence, if it is less than the first, we will increase it by one-third the difference between the two; if it is greater, we will diminish it by one-third the difference. We will proceed in the same manner in comparing the second marginal number as changed with the third as found, and the third with the fourth, etc. If, in so doing, we find two successive increases or two successive diminutions, we will after that use one-fourth the differences.

40. Ex. 15. $x^7 + 17x^3 - 225 = 0$. Root between 1 and 2; take $r = 2$.

$$\text{By A, } x = \sqrt[4]{-17 + \frac{225}{\sqrt[\frac{3}{4}]{-17 + \frac{225}{s^3}}}} \cdot \quad \left(\frac{dr'}{dr}\right) = -\frac{3 \times 225}{4x^7}$$

Convergence by the inverse process.

225 - - -	2.352183	16	
33 - - -	1.518514		
	0.833669 (3		
	0.277889 | × 4		
	1.111558 - -	12.93	3.07
30.95 - -	1.490661	+1.02	
		13.95	

$$\begin{array}{llllll}
 & & 0.861522\ (3 & & & \\
 & & \underline{0.287174}\ \underline{|\times 4} & & & \\
 & & 1.148696 & - \ - & 14.08 & .13 \\
31.04 & - \ - & 1.491922 & & \underline{-.04} & \\
 & & 0.860261\ (3 & & 14.04 & \\
 & & \underline{0.286754}\ \underline{|\times 4} & & & \\
 & & 1.147016 & - \ - & 14.029 & .011 \\
31.033 & - \ - & 1.491824 & & \underline{+.004} & \\
 & & 0.860359\ (3 & & 14.033 & \\
 & & 0.286786 & - \ - & r^{\text{iv}} = 1.9354 & - \ - = x.
\end{array}$$

41. Every root, x, that will render the index of either formula negative, is separated from any root, x', that may be adjacent to it on either side by the occurrence of a break in the function r' somewhere between $r = x$ and $r = x'$. For, as r departs continuously from x toward x', r' must depart continuously from x in the opposite direction. Therefore, before r reaches x', where the two variables come together again, r' must leap back over x; for to suppose otherwise is to assume that r' may pass through x again, while r is at a distance from it.

42. This implies that r and r' can be both continuous between two roots, x' and x'' only when these will both render the index positive. It may be shown generally, in the same manner as for cubics (Art. 19), that, if we place the index equal to positive unity, the resulting value or values of x will separate every such a pair of roots; consequently, if there are two equal roots, they will be identical with the separating number; in which case alone will the same separating number be found from both indices. Thus for the example $x^5 - 15x^3 + 162 = 0$, $\frac{3 \times 162}{2x^5} = 1$ gives $x = 3$, and $\frac{3 \times 15}{5x^2} = 1$ also gives $x = 3$; hence 3 occurs twice as a root of the equation.

43. What I have called the index shows the final rate of convergence; approximately it shows the rate near x. But even when a root will render the numerator and denominator of the index numerically equal, we must not conclude there will be no approximation to it by the formula; we can only infer that it will become indefinitely slow. For although r and r' in that case vary at the same rate at x, they cannot continue to do so in passing from x, because the function is not of the form $r' = r + C$.

44. But, whenever the index shows a slow rate of convergence to a root within ascertained limits, we can obviate the difficulty, either by the methods already pointed out (Arts. 38 and 39), or by changing to the other formula, or by first finding other roots and then depressing the equation to a lower degree.

45. It will be better to rid the equation of fractional exponents, if there be any, before beginning to operate. Thus $x^{\frac{2}{3}} - 3x^{\frac{1}{3}} + 7 = 0$ may be changed to $x^{\frac{4}{6}} - 3x^{\frac{2}{6}} + 7 = 0$, and this again to $y^4 - 3y^2 + 7 = 0$.

Solution of Quadrinomial Forms, etc.

46. The preceding method of solution may also be applied, though with less advantage as to simplicity and rapidity of operation, to various forms of quadrinomial equations, including all complete cubics, and all biquadratics from which one term has been made to disappear. I will illustrate by a few examples. In finding the self-expanding function, it will be seen that at one step we now complete the square of the first member. This expedient is always practicable when one exponent is double another, or when we can render it so and still leave one of the four terms independent of x.

Ex. 16.

$$x^3 - 6x^2 - 7x - 11 = 0$$

$$x^2 - 6x = 7 + \frac{11}{x}$$

$$x^2 - 6x + 9 = 16 + \frac{11}{x}$$

$$x - 3 = \pm\sqrt{16 + \frac{11}{x}}$$

$$x = 3 \pm \sqrt{16 + \cfrac{11}{3 \pm \sqrt{16 + \cfrac{11}{s}}}}$$

From $r'^2 - 6r' = 7 + \frac{11}{r}$ we have $\left(\frac{dr'}{dr}\right) = -\frac{11}{2x^3 - 6x^2}$

Ex. 17.

$$x^4 - 8x^2 + 17x - 13 = 0$$

$$x^4 - 8x^2 = 13 - 17x$$

$$x^4 - 8x^2 + 16 = 29 - 17x$$

$$x^2 = 4 \pm \sqrt{29 - 17x}$$

$$x = \pm\sqrt{4 \pm \sqrt{29 \mp 17\sqrt{4 \pm \sqrt{29 - 17s}}}}$$

From $r'^4 - 8r'^2 = 13 - 17r$ we have $\left(\frac{dr'}{dr}\right) = -\frac{17}{4x^3 - 16x}$

Ex. 18. $x^5 + 12x^4 + 17x^3 - 25 = 0$

$$x^5 + 12x^4 = -17x^3 + 25$$

$$x^2 + 12x = -17 + \frac{25}{x^3}$$

$$x^2 + 12x + 36 = 19 + \frac{25}{x^3}$$

$$x + 6 = \pm\sqrt{19 + \frac{25}{x^3}}$$

$$x = -6 \pm \sqrt{19 + \frac{25}{(-6 \pm \sqrt{19 + \frac{25}{s^3}})^3}}$$

From $r'^2 + 12r' = -17 + \frac{25}{r^3}$ we have $\left(\frac{dr'}{dr}\right) = -\frac{75}{2x^5 + 12x}$.

47. To the remaining forms of higher equations, the method which I have developed is not generally applicable, because, although we may always reduce a given example, in several ways, to the form $x = F(x)$, the function becomes too complicated to be self-expanding, and we can no longer have continuity of operation in a single column. An analogous, though not identical, method may still be applied, however, by performing separate operations, thus, $r = F(r)$, $r'' = F(r')$, etc., for which purpose we may find the index of convergence as before, by differentiating $r' = F(r)$ and substituting x for r and r' in the result; but the operations will be tedious, and applicable only for finding some of the roots; for the function now being generally too complicated to be inverted, we can use only the direct process. We can still find the equal roots by the method indicated in Art. 42.

What was claimed, at the beginning, for the method of self-expanding functions, namely, that for finding the real roots of cubic equations, and of trinomial equations in general, it is a simple and expeditious method, has, I think, been sufficiently shown.

REPORT ON THE METRIC SYSTEM.

By Charles Davies, LL.D.,
Chairman of the Committee on Coins, Weights and Measures.

The metric system of France had its origin in the stormy hours of the French revolution. In the year 1790, Prince de Talleyrand, then Bishop of Autun, introduced into the constituent assembly of France the proposition to establish a new system of weights and measures on the basis of a single and universal standard.

Two standards were considered:

1. The length of a pendulum which should vibrate seconds at a given point on the surface of the earth; and,

2. A given portion of the arc of a meridian.

It was finally agreed to adopt the one-ten-millionth part of the quadrant of the meridian passing through Barcelona and Dunkirk, as the universal standard.

This distance is called a metre. It is equal to 39.37 inches in length, and is the base of the metric, or French system. From this primitive base, or standard, every weight and measure is derived by the application of the decimal scale of tens.

The larger, or multiple units of the base, are designated by prefixing to the base the Greek numerals; and the smaller units, or submultiples, by prefixing to the base the Latin numerals.

In space, there are four kinds of quantity to be measured, viz.: 1st, Distances; 2d, Surfaces; 3d, Volumes; and, 4th, Angles; hence, there must be four units of measure.

I. Distance.—For this the unit is the metre, which is increased and diminished according to the scale of tens.

II. Surfaces.—For small surfaces, the square metre, and the squares constructed on its decimal divisions, are used. For the area of land, the base unit is the square constructed on the deca-metre, called an *Are;* hence an *are* contains 100 square metres, each of which is called a centi-are. In this measure, therefore, there are three units, viz.:

Centiare = 1 square metre = 1.195985 square yards;
Are = 119.6 sq. yards = 4 perches, nearly;
Hectare = = 2.471 acres.

III. CUBIC MEASURE, or Measure of Volume:—

1. The cubic metre, which is used for the measurement of excavations and embankments. It is equal to 35.316 cubic feet.

2. The cubic metre is also used for the measurement of wood, and is then called a stere, which has one sub-multiple, called a deci-stere, and one multiple, called a deca-stere. Hence, for wood measure, there are three units; deci-stere, stere, and deca-stere. The base-unit, the stere, slightly exceeds a quarter of a cord.

3. The litre is used for the measurement of all liquids and dry articles. It is the cube constructed on the deci-metre as an edge; and hence, is one-thousandth part of the cubic metre, equal to one wine quart, very nearly.

IV. FOR ANGLES.—Although the metre is derived from the arc of a meridian, it is a singular fact that neither it, nor any multiple or sub-multiples of it, is used in the measurement of circles or angles. In this department of measurement alone, the old unit and its subdivisions are preserved.

WEIGHT.—The unit of weight is the weight of a cube of water constructed on the centimetre as an edge; and is called a *gramme*. It is equal to about 15.32 grains Troy. The kilogramme, equal to 1000 grains = 2½ lbs., is the unit for larger weights.

Before examining this system of weights and measures, a few remarks seem necessary in regard to the nature and uses of numbers.

Every number is derived from a fixed unit, or base, either by the process of augmentation or division; and that base is invariably called one, or the unit of the number. Thus five comes from 1, by taking it 5 times; and one-fifth comes from 1, by dividing 1 into five equal parts. To apprehend distinctly the signification of a number, two things are necessary:

1st. To apprehend, distinctly, the *unit* of the number; and, 2dly. To comprehend, clearly, *how many times* that unit is taken.

If the base-unit is too large, two difficulties are encountered: 1st. The difficulty of apprehending its exact value; and, 2dly. The smaller numbers must be expressed fractionally. Thus, if our smallest unit of length were the yard, it would not be so easy to impress the mind of a child with its exact value, as it is to give the idea of a foot; and all distances less than a yard would be expressed fractionally. Thus, the foot would be one-third of the yard, and the inch one-thirty-sixth of the yard, and these would be very indistinct impressions compared with our present system, in which the foot is the base-unit, and the inch, one-twelfth of it.

Again, if the base-unit be too small, it must be repeated many times in order to express large quantities; and the mind finds much difficulty in apprehending a number in which the unit is taken many times. Thus, we comprehend very easily, 1 mile, when we have reached it through the units, 1 foot, 1 yard, 1 rod, and 1 furlong, each of which being expressed in small multiples of the preceding unit, is easily apprehended. But if we say a mile is 1,760 yards, we have to reflect a little before we comprehend the distance, as the number arises from taking the base-unit, 1 yard, 1760 times; and if we call the mile 5280 feet, we apprehend it still less distinctly; and the mind is hardly willing to make an analysis, when we say the mile is 63,360 inches.

Now, the French system adopts the metre as the only unit of distance. No other unit is permitted. Hence, all distances greater than the metre are expressed in multiples of the metre; and all distances less than the metre, in decimals of it. The distance to the sun and the diameter of the spider's web are both measured by the same unit; which is quite too large to measure the one, and quite too small for the measure of the other.

These are some of the difficulties resulting from a single unit of length. It is of the first importance, in the construction of a system of numbers, to have all the different units flow directly from the *base-unit* and from each other, without the intervention of fractions. In our system, the square foot and the cubic foot, the square yard and the cubic yard, are but squares and cubes constructed on the units of length.

For the measurement of land, we reach the acre through the perch and rood; and the acre is a unit of convenient size for large areas. In the French system, the smallest surface, expressed without the aid of fractions, is the square metre, equal to about 10 square feet; the next smaller unit is the square on the decimetre, which is equal to one-hundredth of the square on the metre, and so on, for units still less. Thus, in this system, all the units of surface, less than the square on the metre, are obtained by squaring a decimal part of the metre; and the units thus obtained, besides their fractional origin, have no names, and are connected, not by the scale of tens, but by the scale of 100, The principal unit for the measurement of land is the square constructed on the decametre, which is called an *Are*, and which is equal to about four perches, or, the one-fortieth of our acre. One hundred of these make the hectare; so that the units for the measurement of land are:

The centiare, or square metre;
The are = 4 perches, nearly; and
The hectare = about 2½ acres.

The adoption, therefore, of a single unit for the measurement of length carries with it the necessity of constructing other base-units, either on multiples or on fractional parts of the unit of length; and also of a change of scale, in expressing the relations of the derived units. Thus, for land measure, the *are* is a square constructed on the decametre, and the ratio of the units, to each other, is 100, instead of 10.

The *litre*, which is the unit of measure for dry articles and liquids, is the cube constructed on the decimetre as an edge, and is equal to the one-thousandth part of the cubic metre, to which it must be referred before we can apprehend its value.

STANDARD UNITS OF LENGTH NOW IN USE.

The smallest unit named in our tables is the barleycorn, three of which, laid in a row, make an inch. The inch, also, has a symbol in the distance from the end of the middle finger to the first joint, and twelve such distances make a foot. The foot is the unit of length with which we are most familiar, and was undoubtedly adopted as a standard of measure from that part of the human body from which it takes its name. The average measure of the naked foot is but the fraction of an inch below the standard; and in its ordinary covering approximates very nearly to it. The foot has, also, another type in the human body; the average distance across the hands when the extremity of one thumb is placed at the upper extremity of the nail of the other.

The first measure named in sacred history is the cubit; the average distance from the elbow to the extremity of the middle finger. The yard also, has its representative in the human body, being the average distance from the centre of the lips to the extremity of the middle finger, when the arm is extended. The fathom is the distance between the extremities of the middle fingers, when both arms are extended.

The pace, or long step, also corresponds to the yard, and is the natural unit for all itinerary distances. Thus, all the elementary units of measure, except the barleycorn, are derived, directly, from the human body, and every individual carries about him an approximate standard.

It has been urged against the continuance of our present system, that its units are derived from the varying and uncertain standards of barleycorns and the feet of men ; while, in fact, these are only the sensible objects from which the exact units are derived, and to which they are referred for the purpose of impressing their values on uninstructed minds. Our standard of length is the standard yard of the British empire, and is symbolized by a metallic bar, made by Bird, in 1760, when at the temperature of 62° Fahrenheit. By act of Parliament in 1824, it was provided that in case of total destruction or loss of the standard and all its authentic copies and fac-similes, that its length be considered 36 inches, *such*, that 39.13929 of them are equal to the length of a pendulum vibrating seconds, *in vacuo*, at the sea level in the latitude of London; and this, we shall see, is precisely the means which the French have adopted to replace their standard, in case of accident. Hence, the two systems rest on a common principle.

QUESTION TO BE CONSIDERED.

The question is now under consideration, both in this country and in Europe, whether the French system of weights and measures shall become the universal standard. Whether the metre shall be adopted as the only standard of length; whether we can adopt the *Are* as the base and only unit of all land measurements; the *Litre* for all volumes; and the *Gramme* as the unit of all weights. These questions have already been carefully and fully considered.

On the 14th of December, 1819, the House of Representatives passed the following resolution, viz.:

" *Resolved*, That the Secretary of State be, and he is hereby, directed to report to this House a statement relative to the regulations and standards for weights and measures in the several States, and relative to proceedings in foreign countries, for establishing uniformity in weights and measures, together with such a plan for fixing the standard of weights and measures for the United States as he might deem most proper for their adoption."

In obedience to this resolution, on the 22d of February, 1821, John Quincy Adams, then Secretary of State, made a very full and able report. The report is a complete and careful analysis of the whole subject, by a mind full of knowledge, and looking at it from the stand-point of science and statesmanship. The subject has also been fully examined by Sir John Herschel, in his lecture on the yard, the pendulum, and the metre, considered as a standard.

It may be regarded as fortunate for the interests of knowledge, that a subject so important and so full of interest to a hundred millions of people should have been examined and passed upon by two such minds; and that they should have left to posterity the rich treasures of their labors.

The decree of the Convention of August, 1793, established, in France, all the principles of the new system. Its denominations were entirely different from those before in use, and from any which have since been adopted. For many years thereafter, there was continued change and conflicting legislation. Finally, on the 12th of February, 1812, an imperial decree was issued which presented the whole subject under a new aspect. It, in fact, restored the old system practically, and retained the new one only in name. The following is an analysis of it, given by Mr. Adams:

"It cannot escape observation that this decree and explanatory ordinance engrafted upon the legal system an entirely new system, founded upon different, and in many important respects, opposite principles, so that the result up to this time (1821) of the most stupendous and systematic effort ever made by a nation to introduce uniformity in weights and measures, has been a conflict between four distinct systems:

"1. That which existed before the revolution;

"2. The temporary system established by the law of 1st of August, 1793;

"3. The definitive system, established by the law of December 10th, 1799; and,

"4. The *usual* system, permitted by the decree of 12th February, 1812.

"This last decree is a compromise between philosophical theory and inveterate popular habits.

"Retaining the principles of decimal multiplication and division for the legal system, it abandons them entirely in the weights and measures which it allows the people to use. Instead of the metre and its decimals, it gives the people a toise of six feet, an une of three feet, and a thumb of twelve lines. And these measures, instead of divisions, exclusively decimal, are divisible into halves, thirds, quarters, sixths, eighths, twelfths, and sixteenths.

"Instead of a decimal kilogramme, it gives them a pound of sixteen ounces, an ounce of eight gros, and a gros of twenty-two grains.

"The measures of capacity, wet and dry, have the same indulgence; and while the standard weight and measure are deposited in the national archives, the people have restored to them, for use, all the *names* and divisions of their ancient weights and measures, though not the same things. For the toise, which is twice the length of the metre, is not the old toise; the foot, which is the third part of the metre, is not the pied de roi; but both are longer measures. The half-kilogramme, which is a pound, is not the ancient markweight pound; nor are the toisseau or litre those of ancient times; they are all, respectively, approximations of them.

"If the existing system and practice terminated here, it would be far from having attained the ideal perfection of uniformity; but it is believed that, for a multitude of purposes, with this double and complicated system, there is yet a very extensive remnant in use of that which prevailed before the Revolution.

"The changes which have forced themselves upon the new system, under the attempts to reduce it to practice, should serve as admonitions to correct the errors of theory; but not operate as discouragements to the pursuit of the principal object, *uniformity*. The French metrology, in the ardent and exclusive search for an universal standard from nature, seems to have viewed the subject too much with reference to the nature of things, and not enough to the nature of man. Its authors do not appear to have considered, in all the bearings of the system, the proportions dictated by nature between the physical organization of man and the *unit* of his weights and measures. The standard taken from the admeasurement of the earth, has no reference to the admeasurement and powers of the human body. The metre is a length of forty inches, nearly; and by applying to it, exclusively, the principle of decimal divisions, no measure corresponding to the ancient *foot* was provided. A unit of that denomination, though of slightly varied differences of length, was in universal use among all civilized nations; and the type of it is found in the dimensions of the human body. Perhaps for half of the occasions which arise in the life of every individual for the use of a linear measure, the instrument to suit his purposes must be portable, and fit to be carried in his pocket.

"Neither the metre, the half-metre, nor the decimetre, are suited to that purpose. The half-metre corresponds, indeed, with the ancient cubit; but, perhaps, one of the causes which have everywhere, since the time of the Greeks, substituted the foot in the place of the cubit, has been the superior convenience of the shorter measure. Besides which, the cubit being the unit, the half-cubit might serve the purposes of the foot; but the metre, divisible only by two and ten, gave no measure practically corresponding to the foot, whatever. It appears to have been considered that decimal arithmetic, although affording great facilities for the computation of numbers, is not equally well suited for the division of material substances. A glance of the eye is sufficient to divide material substances into successive halves, fourths, eighths, and sixteenths. A slight attention will give thirds, sixths, and twelfths. But divisions into fifth and tenth parts, are among the most difficult that can be performed without the aid of calculation.

"Among all its conveniences, the decimal division has the great disadvantage of being itself divisible only by the numbers two and five. The duodecimal division, divisible by two, three, four, and six, would offer so many advantages over it, that while the French theory was in contemplation, the question was discussed, whether the reformation of weights and measures should not be extended to the system of arithmetic itself, and whether the number twelve should not be substituted for ten, as the term of the periodical return to the unit. Since the establishment of the French system, this idea has been reproduced by philosophic critics as an objection against it; and Delambre, in the third volume of the Base du Systême Matrique, has considered it, and assigned the reasons for which it had been rejected. He admits, to the full extent, the advantages of a duodecimal over a decimal arithmetic, but alleges the difficulty of effecting the reformation, as the decisive reason against attempting it."

The decree of February 12th, 1812, was the triumph of the popular will over the acts of the government. It practically abolished the new system, and re-established the old one. It arrested those attempts at change which had caused so much trouble and perplexity, and brought again into use old names and old things, with which the people were familiar.

But the conflict between legislation and the popular will, between what the law required and what the law permitted, did not end here; it was continued for a quarter of a century, when the whole subject was finally disposed of by the strong arm of power.

A law of July 4th, 1837, repealed the decree of February 12th, 1812, and ordered the exclusive use of the decimal metric system. A royal decree of April the 17th, 1839, regulated the relations of weights and measures. A decree of July the 16th, 1839, determined the denominations, form, and dimensions of all instruments and measures, for trade and use. The metric system is now obligatory and is exclusively used in the French empire, and has been so since 1840, the time named for the entire discontinuance of all other systems.

The system, however, as now established, is not exclusively decimal. The measures of distance, sanctioned by the laws and decrees of 1837 and 1839, are, the metre, the demi-metre, the double decimetre, and the decimetre; and in the ascending scale, the double metre, the demi-decametre, the decametre, and the double decametre; eight in all.

For the measurement of land, there are but three units; the centiare, or square metre; the *are*, and the hectare; and in this measure, in passing from one unit to another, the scale is 100. In the denominations of volume and weight, each unit has a *half* and a *double;* so that, in fact, there are three times as many units in use, in these denominations, as there are in the tables; and this concession was necessary, for the half and the double would not be excluded.

The departure from the decimal system has greatly multiplied the number of units, so that now there are eight units of linear measure, three of square measure, three of land measure, fourteen of liquid and dry measure, six of solid measure (including three for wood), and twenty-three in weight; making fifty-seven in all; while the tables of the system contain but twenty-eight units; the halves and the doubles being entirely omitted. This discrepancy between the tables and the units in general use is, in fact, a fatal difference between theory and practice, and must lead to complexity and embarrassment.

The friends of the metric system urge its universal adoption, for three reasons:

1st. That it is derived from the metre, which they declare to be a *fixed*, and natural unit or standard;

2d. Because the decimal scale is employed in forming the multiples and submultiples of the base-unit;

3d. Because of the simplicity and comprehensiveness of its nomenclature.

That the metre, as determined by the French measurement, is neither a true nor an accepted standard, is a fact well known to all men of science; as the following extract from the lecture of Sir John Herschel, the greatest of living astronomers, fully shows. He says:

"Let us now see how far the French metre, as it stands, fulfills the requirements of scientific and ideal perfection. It professes to be the 10,000,000th part of the quadrant of the meridian passing through France from Dunkirk to Formentera, and is, therefore, scientifically speaking, a local and national, and not a universal measure. The earth's equator is not a perfect circle, but slightly elliptical, and the meridians of places differing in longitude are, therefore, not all of the same length. The difference, however, is so trifling (the ellipticity of its equator being not more than a thirtieth part of that of its meridian), that to raise an objection against the practical reception of the metre, either *per se*, or as a substitute for the yard, on this score, would savor of hypercriticism. A more serious objection is the choice made of the circumference of the meridional or generating ellipse of the terrestrial spheroid, in preference to its axis of revolution. This is a blemish on the very face of the system; a sin against geometrical simplicity. Still, were the length of the metre, as determined by the French geometers, rigorously exact, or correct within limits which the much more extensive measurements of meridian arcs, since made, elsewhere than in France, have proved to be attainable, this would be only a matter of regret, and could hardly, of itself, be drawn into an argument for its rejection. But this is far from being really the case. The metre, as represented by the material standard, adopted as its representative, is too short by a sensible and measurable quantity, though one which certainly might be easily corrected."

To this testimony must be added that of Mr. Airy, the astronomer having charge of the Greenwich Observatory, and M. Schubert, a Russian astronomer of great eminence, pointing out specifically, the extent of the error, and giving reasons why the metre should not be accepted as a standard. Without stopping to examine and weigh these reasons, it is enough for our present purpose to know, that the science of the world has not accepted the one-ten-millionth part of the quarter meridian, as having a *fixed value*, represented by the metre, and that the ablest minds in England will probably not so accept it.

Furthermore, as stated by Sir John Herschel, "The report of the French commissioners, in 1798, which led to the enactment of the metrical system, is careful to state that in the event of the total loss or destruction of all material representations of the metre, its value would be easily recoverable from a numerically specified relation between its length and that of the pendulum vibrating seconds at Paris, which had been determined with great accuracy by Borda, one of the commissioners. So that, practically speaking, in the event of the total destruction, by political convulsions, of every authentic yard and metre (supposing every written record of an existing knowledge to survive them), the metre would have been recovered, not by the laborious and costly process of re-measuring the French meridian arc, but by the infinitely more summary one of a precise repetition of Borda's experiments, and the exact reapplication of all his corrections and reductions;" so that the two standards, the English and the French, rest, essentially, on the same basis.

2. In regard to the simple use of the decimal scale, we have already shown that in most of the weights and measures, each unit has a half and a double, where, of course, the scale of connection is two, not ten; and this having been adopted from necessity, after the adoption of the system itself, one-half of the units in common use are not in the tables at all; so that the pupil, after having learned his table-book at school, has a new set of units to learn in practical life.

Besides one of the four great divisions of measure, viz., the arcs of circles, including all that belongs to the earth in geography, and all that belongs to the heavens, as examined and measured by the science of astronomy, the attempt to apply the decimal system has utterly failed, and is now entirely abandoned.

3. The nomenclature, by taking the four base-units, the METRE, the ARE, the LITRE, and the GRAMME, and applying to them the Greek numerals for the multiples of the unit, and the Latin numerals for the sub-multiples, has been thought to simplify, very much, the language of the entire system; and so it undoubtedly does to the mind and apprehension of a scholar. But it must be remembered that the tables of arithmetic are learned and used by thousands who will never know the difference between deca and deci, between hecto and centi, as derived from the Greek and Latin; and hence, deca-metre, hecto-metre, deci-metre, and centi-metre will have to be

learned as separate words. Now, all teachers have experienced the great difficulty in communicating ideas differing widely from each other, when the language used is nearly the same; and a child, knowing nothing of the Greek and Latin, would find greater difficulty in distinguishing between deca-metre, and deci-metre, between hecto-metre and centi-metre, than he would if the things were called by entirely different names. If he do not *know the law*, the similarity and resemblance of the words are great hindrances. These remarks are alike applicable to the nomenclature of the entire system.

QUESTION SOON TO BE DECIDED.

It is generally known that Congress, in the year 1866, passed a law permitting the use of the metric system, and directed certain of its weights and measures to be sent to offices having a close connection with foreign countries. The question is now being discussed, and must soon be passed upon, whether this system shall be adopted in the United States. Having explained very briefly the nature of the system, and something of its history, the Convocation will readily understand the reasons which have governed the committee in the conclusions to which they have arrived.

1. If the metric system be introduced, it must supersede all present systems. We must adopt the system as a whole, and exclude every other. The history of its introduction and early use in France, clearly prove this. The French people struggled against it for twenty years; and finally, practically overthrew it with the concurrence and sanction of the great Napoleon, in the palmiest days of the empire. Then followed twenty-five years of confusion, under different and conflicting systems, when a new revolution so strengthened the power of the government that the metric system was re-established in 1837, and the use of any other weight or measure made a penal offense. That the conflict will be fierce in this country, where the people are freer and less habituated to blind obedience to imperial edicts, cannot be doubted; nor will the fact, that the system comes from a foreign country, whose language and institutions are alike unknown to us, be without its influence.

2. An unwillingness to abandon what has been tried and known, for what is untried and unknown, appears to be a law of the human mind. It is a species of intellectual inertia, corresponding to the inertia of matter that pervades all bodies. We have, in the history of our own currency, a striking illustration of this principle.

One of the first acts of Congress, after the establishment of the government, was to define and fix the currency. The unit selected was the best possible; the dollar, and the divisions of it, according to the decimal scale, gave promise of an early adoption, and an entire uniformity. But nearly eighty years have now elapsed, and the desired uniformity is not attained; for, in many places accounts are still kept in the old currency. Such are the fruits of the force of habit, and of tenacity to established systems.

3. The committee do not believe that the opposition to the metric system, in France, arose solely from an unwillingness to change names and forms, or from a blind attachment to old usages; though this doubtless did, and always will, exercise a strong influence.

Their old system of weights and measures sprung up from the common necessities of mankind. All the units of measure, with which the nation was familiar, were found, very nearly, in the parts of the human body. The relation between those units had been established by the people themselves, either from computation, or measurement, or the exchange of their commodities. A system having such an origin was more likely to meet the wants of a people than one made amid the turbulence of a revolution, by a committee of learned professors.

4. The committee has already referred to some of the objections to any system of numbers where the multiples and submultiples are all formed from a single unit, as a base. We will now consider other objections from the stand-point of the school-room.

EDUCATIONAL VIEW.

Every teacher knows that the first step in a course of arithmetical instruction is, to impress the pupil with a distinct and full apprehension of the unit of number, whether that unit be abstract or denominate.

What shall be the unit for distance, and whether there shall be more than one, are important questions.

The entire system of instruction in mathematical science; all weights and measures, and, to a certain extent, the mechanic arts, are concerned in these questions. It is the opinion of the committee, that the metre is too large for a base-unit:

1st. Because it is not easy to give a young and uninstructed mind a distinct apprehension of it; and

2dly. Because there are many things to be measured, in the common affairs of life, less than the metre, and these must all be expressed in fractions of that unit.

The committee are also of opinion, that other units, besides the base-unit, should be used as secondary bases of collections of numbers.

Taking the foot as the unit of distance, in our own system, we measure all the distances less than it by its divisions into twelfths, and all distances greater may be measured by the foot unit. But the apprehension becomes dim as the numbers grow large; and young minds, in computation, must be trained in small numbers. Hence, we take a second unit, 1 yard = 3 feet; and instead of saying 300 feet, we say 100 yards. We then take the rod, the furlong, and the mile, as units, in succession, and thus avoid the use of large numbers, for small distances, by conducting the mind, gradually through a series of ascending units, instead of expressing all numbers, great and small, by the same unit.

What would Follow.

Let us suppose the metric system to be adopted by law, and every other system excluded; for without such exclusion, the whole thing would be a perplexity and a farce. What follows? We have blotted out, from the mind of the nation, the foot and all knowledge of every measure into which it enters, as a unit. We have expunged the yard, used in connection with the arm, more or less in every family; and the pace, the unit and guide of the farmer, for an approximate measure, that will not supply the place of either.

Every lot of ground 25 feet front, by 100 feet deep, must be described as follows: 7 metres, 6 decimetres, and 2 centimetres front, by 30 metres, 4 decimetres, and 8 centimetres deep. Thus the description of every such lot will require three different units and six words, instead of one unit and two words. In all conveyances and descriptions of land, the translation from one language to the other would occasion great trouble and difficulty.

The old familiar mile, of 1760 paces, is also gone, and the distance from Albany to New York, one hundred and forty-five miles, will be known to us, if known at all, as 229,680 metres.* Let us see how we shall recognize the earth, in its new dimensions. Its diameter, instead of eight thousand miles, in round numbers, will be 12,672,000 metres; and its circumference, about 39,810,355 metres and 2 decimetres. Is not the difficulty of apprehending and comparing large distances greatly increased, by expressing them in small units and large numbers?

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* In these calculations, the metre is taken equal to 40 inches.

The cubic foot, known wherever the English language is spoken, as the simplest unit for the measurement of volume, is also gone, and in the twilight of its existence we grope about for a substitute. We find it in the cubic metre, about thirty-five times as great as the cubic foot; a volume quite too large to be apprehended by children, and altogether too large for a base-unit. Or, we find it in the litre, the cube constructed on the decimetre as an edge; equal to one-thousandth part of the cubic metre, or to the one-four-hundredth part of the cubic foot; a unit quite too small for common measurements. Into this unit merges one gill, one quart, one gallon, one peck, one-half bushel, and one bushel. They all disappear, and we measure in the litre, and its multiples and submultiples. The acre is also gone, with its submultiples, the rood and perch, and all its linear dimensions. For it we have the *are*, about one-fortieth of its value; so that a quarter-section of land of 160 acres, will be known to us as containing 6,400 ares. Since the commencement of the present century, the public lands have been surveyed and laid out in townships six miles square, each containing, of course, thirty-six square miles, or 23,040 acres. The side of each township, by the new system, would contain 9,504 metres (instead of six miles), and its area 921,600 *ares*. All the lands, from the Ohio River to the Pacific Ocean, have been surveyed, deeded, and recorded in the units of the square mile and the acre. What will be the labor and the confusion of translating every deed and record into the language of the metre and the are? We should scarcely know our own farms by their new names.

EFFECT ON WEIGHTS.

We come next to the unit of weights. In our own system, it is derived directly, and in whole numbers, from the cubic foot. A cubic foot is supposed to be filled with distilled rain-water, and one-thousandth part of this weight is taken as the unit; the ounce avoirdupois. This being too small for the measure of ordinary weights, its multiple by 16, or the pound avoirdupois, is taken as the unit of weight; and from this come the multiples—quarters, hundreds, and tons.

In the Metric System, a cube, described on the centimetre as an edge, is filled with water at the freezing point, and this weight is taken as the unit, and is called a *gramme*. It is equal in value to about the 454th part of one pound, avoirdupois. This small unit is made the *base* of the entire system of weights. Hence, the weights of all common articles are expressed in very large numbers. For example, a piece of beef, for dinner, which we designate by the modest number, 14 pounds, would have its weight expressed by 6,356 grammes; or by 6 kilogrammes, 3 hectogrammes, 5 decagrammes, and 6 grammes; whilst a ton of coal of 20 hundred pounds would be read, 908,000 grammes; or 1 quintal and 8 kilogrammes. As a general rule, all the readings of numbers are made in the lowest unit. In weights, therefore, as in the other denominations, corresponding difficulties arise from the smallness of the base-unit, and from using but a single base. If the introduction of the Metric System produced only a change in the *names* of the units, leaving their values the same; or, if it altered the values only, preserving their names, the difficulties would be comparatively small. But, unfortunately, we must change both ideas and words; the foundations of systems and the language by means of which these systems are developed and made known. These double changes, made at the same time, are very serious.

CHANGES IN VALUES AND PRICES.

We must not forget that prices and currency are dependent upon, and necessarily adjust themselves to, weights and measures; and that all our ideas of cost and value are fixed with reference to our present units. The adoption of the Metric System, therefore, would carry with it an entire change in the money values of all articles of commerce and manufactures, and of all agricultural productions; for these values would have to be readjusted to the new units, and to be expressed in the new language.

CONSEQUENCES OF MAKING THE PROPOSED CHANGE.

1. It would strike out from the English language every word and phrase and sentence used in connection with our present units of weights and measures, and would impose the necessity of learning a new language for the one now in use:

2. It would blot out from the knowledge of the nation all apprehensions of distance, and area, and volume, acquired through the present units, and would render necessary the acquirement of similar

knowledge by less convenient units, having different relations to each other, and expressed in a new and unknown language:

3. It would extinguish all knowledge of money values, now so familiar to the entire population in their daily purchases, and sales, and barters, for those values are all adjusted with reference to the units of weights and measures; and

4. It would change the records of our entire landed property, requiring them all to be translated into a new and foreign language. Should all this be done merely to change one standard from 36 inches to 39.37 inches, when both standards are determined, substantially, in the same manner?

The convenience, the almost absolute necessity, of a common unit of coin among commercial nations, is too apparent for argument, and this urgent necessity has suggested common units of weights and measures. But these, although highly desirable, are by no means so important. The sale and purchase of land very seldom reaches to foreign countries; and, hence, there is little need of a common unit. In weights and in measures other than land, a common unit is certainly desirable, but not so much so as in currency. The practical question presented is, whether the advantages resulting from the changes suggested, would be a compensation for the trouble and perplexity that must arise in making them.

But even if the changes, on the whole, be deemed desirable, it is obvious that they should only be made at the same time and in conjunction with their adoption by the English government.

With the English people we have a common origin, a common history, a common literature, and a common language. Would it not be most unwise to interrupt our commercial relations with such a people, by the introduction of a new and foreign language, to them and to ourselves, into trade and commerce?

DECIMAL SYSTEM.

The Metric System has been recommended to our adoption because of its decimal scale; and the twin ideas of a common unit for all nations, and the decimal multiples and submultiples of that unit for all numbers, are certainly most attractive. But Bacon has proved to the world that systems developed from abstract theories are not as likely to prove useful and satisfactory, or to be in accordance with true philosophy, as those which are founded on facts derived from observation, experiment, and experience. For the purpose of *calcu-*

lation alone, the decimal system is greatly superior to every other; but for sensible objects, which are daily measured and handled, the French themselves have departed from it by introducing the half and the double, for most of the units, as may be seen from the tables.

In a system of instruction, it is as necessary to preserve the regular order of the *fractional units*, when we divide the unit, as it is to preserve the order of the numbers, when we collect or aggregate it. In whole numbers, we reach ten only through a knowledge of the preceding numbers from 1 to 10. So of one-tenth, we apprehend it only when we have divided the unit into two equal parts, into three, into four, into five, and so on up to ten. The *fractional units*, one-half, one-third, one-fourth, one-fifth, etc., must each and all be clearly apprehended before the mind can grasp, as a crystallized idea, the fractional unit one-tenth. Hence, no system of instruction can dispense with the divisions of the unit into any number of equal parts, nor can positive legislation effect it. So in material things. The simplest idea of division is to halve the thing to be divided, then to divide it into thirds, then into fourths, and so on for any division whatever.

It was a most fortunate circumstance that Congress, in the early history of the government, established a decimal currency. It is much to be regretted that there is any other. This Act, alone, gave us the decimal system, for all money values and for all computations of price and cost; and these embrace by far the larger portion of our calculations. It did even more. It turned attention to the beauty, the simplicity, and the harmony of the system itself, and we are rapidly approaching to its exclusive use in all cases of computation. The chain, used in surveying land, is of such length that 10 square chains make an acre. It is divided into 100 links, so that chains and links multiplied by chains and links give, in the product, acres and decimals of an acre. Here, in computation, the decimal system is perfectly applied; and surveyors now omit the rood and perch, and write their final results in acres and decimals of the acre. This tends to simplicity, and introduces no confusion. So in levelling; the staves are now divided, and the field-notes are kept in feet and decimals of the foot, and the computations are made entirely in these units. In field-notes, where yards are used, the fractions of the yards are generally recorded in the decimal language. Thus, we are gradually approximating to the decimal system, and if not embarrassed by legislative enactments, we shall soon reach it, in every case to which it can be advantageously applied.

CONCLUSIONS.

The committee, for the reasons above given, have not been able to see how any system of weights and measures can be an acceptable substitute for the one now in use, unless it makes some provision for retaining the unit, one foot. All our knowledge of distances, the yard, the rod, the furlong, the mile, the league, come from it. The square rod or perch, the rood, the acre, are also derived from it. Can we change the survey of an entire continent, with the description of every piece of land upon it, from the unit, one Acre, to the unit, one Are, forty times less? Can we change, without great confusion, the units of volume, the cubic foot and the cubic yard, so familiar to every school-boy? and, above all, can we change our unit of weight, the pound avoirdupois, which is equal in weight to sixteen of the one-thousand equal parts of a cubic foot of rain-water? It seems to the committee that we must retain the following units: viz.,

1 foot in length,	1 square foot,	1 cubic foot;
1 yard,	1 square yard,	1 cubic yard;
1 rod,	1 square rod, or perch,	1 acre;
1 mile,	1 square mile, or	640 acres;
1 quart (liquid),	1 gallon,	1 barrel;
1 quart (dry),	1 peck,	1 bushel;
1 pound,	1 hundred,	1 ton.

Can we abandon, as a mere question of language, these short, sharp Saxon words, for their equivalents expressed in a foreign language? Besides, the foreign language which we introduce has no exact equivalents to these words, which have almost become things, and which now form a part of the mind and knowledge of every people which speak the English tongue, or are connected with American commerce.

WEIGHTS.

On the subject of weights the duty of the committee seemed both plain and imperative. We have the Avoirdupois, the Troy, and the Apothecaries' weight. The pound in the Avoirdupois weight differs from the pound in the other two, and in each the ounce is differently divided.

The attention of the committee was first directed to the inquiry, how can these three systems of weights, differing apparently so widely, be reduced to a single system with the least possible change and inconvenience?

The Avoirdupois weight being much more used than either, or both of the others, they of course should be assimilated to it; and the Apothecaries' weight, being used more than the Troy weight, it is less inconvenient to change the latter than the former.

In analyzing these weights, it is found that the ounce in the Apothecaries' weight, and the ounce in the weight Troy, are identical; and that each exceeds the ounce Avoirdupois by its eighty-three-thousandth part, very nearly; hence, if the ounce Troy, or the Apothecaries' ounce, be diminished by its eighty-three-thousandth part, the result will be the ounce Avoirdupois, or the one-thousandth part of the weight of a cubic foot of distilled rain-water, and then, *these three weights will have a common unit.* As the Avoirdupois is now mainly used for all weights greater than an ounce, and the others for weights less than the ounce, the three can be united on that common base, with very little inconvenience. The new Avoirdupois weight would then be as follows:

20 grains	make	1 scruple,
3 scruples	make	1 dram,
8 drams	make	1 ounce,
16 ounces	make	1 pound,
25 pounds	make	1 quarter,
4 quarters	make	1 hundred, and
20 hundreds	make	1 ton.

This would preserve, in the Apothecaries' weight, all the units including and below the ounce, with this only difference, that each would be eighty-six thousandths less than before, while the change in the value of the pound and in the units of higher denominations, would be attended with little or no embarrassment, as the Avoirdupois weight is now chiefly used in all wholesale transactions.

In the Troy weight, the principal unit, the ounce, would be preserved in name, with the diminution of only eighty-six thousandths of its value; the ounce would still continue 480 grains, as now, and the only change would be the substitution of the scruple and dram for the pennyweight. These slight changes would perfectly harmonize the three systems of discordant weights.

COINS AND CURRENCY.

The questions connected with coins and currency have seemed to the committee very plain and simple.

We are indebted to the wisdom of Congress, at the very birth of the government, for a system of coins and currency perfect in its general outline, and admirable in all its details. The unit, one dollar, is a better unit than the franc, which is too small, and better than the pound sterling, which is too large. Its decimal multiples and sub-multiples are in accord with the decimal system, the most perfect for computation which the world has ever known.

It is, however, a subject of equal surprise and regret, that a system of currency so perfect, and having the force and the authority of law, should have found its way so slowly into general use.

About eighty years have now elapsed since it became the legal and only recognized currency; and yet, in all our standard arithmetics, we find New England, Virginia, Kentucky and Tennessee currency, in which six shillings are reckoned in the dollar; New York, Ohio, and North Carolina currency, in which eight shillings are reckoned in the dollar; New Jersey, Pennsylvania, Delaware and Maryland currency, where 7*s.* 6*d.* are reckoned in the dollar; and South Carolina and Georgia, where 4*s.* 8*d.* are reckoned to the dollar; and if our information be correct, accounts are still kept, in many of the States, to a greater or less extent, in these old continental currencies.

The first step toward uniformity at home should be the entire elimination from our elementary arithmetics of all these antiquated currencies. To consume the time of the young, at school, in teaching old systems long superseded by better ones, is little short of a crime.

In regard to foreign coinage, the committee have great satisfaction in stating that a near approximation to a common unit of value has already been reached, and that an agreement on a common unit would seem to be easily attainable.

The five-franc piece is so nearly equal in value to our dollar, and five of our dollars so nearly equal to the English pound sterling, that a very slight change in value would make the dollar and the pound multiples of the franc, and thus reduce the currency of the three great commercial nations to a common unit. Two of them, France and the United States, have already adopted the decimal division; and the report of Sir John Bowring on the decimalization of the English currency so clearly proves the great value of the decimal system over every other, that there can be no reasonable doubt of its early adoption.

The committee have embodied the substance of their report in a series of resolutions, which they now beg leave to submit:

1. *Resolved*, That the subject of changing our entire system of

weights and measures and substituting therefor the Metric System of France, is too grave and too important to be acted upon without a very full and careful examination of all its bearings and all its consequences.

2. *Resolved*, That the committee on coinage, weights and measures, be requested to publish their report to this Convocation, with such additions as they may deem necessary, in connection with the report of John Quincy Adams, on weights and measures, made to the House of Representatives, in the year 1821, and the lecture of Sir John Herschel, on the Yard, the Pendulum and the Metre, to the end that the whole subject may be more fully discussed, considered and understood.*

3. *Resolved*, That this Convocation do recommend to all teachers and to all others interested in the establishment of uniform standards throughout the world, to give special attention and study to this subject, now engrossing public attention, that it may be finally disposed of wisely, and for the common interest of all nations.

4. *Resolved*, That this Convocation do hereby express its conviction that such changes should be made in the values of the franc, the dollar, and the English pound sterling, that five francs be exactly equal in value to one dollar, and five dollars exactly equal in value to one pound sterling.

5. *Resolved*, That as a means of reaching uniformity of currency, it be and it is hereby earnestly recommended to all authors and publishers of elementary arithmetics, to exclude from future editions every currency not recognized and established by law.

6. *Resolved*, That the committee on coins, weights and measures, be, and they are hereby authorized to ask the attention of the government, and of all associations for the advancement of science and knowledge, to the expediency of changing the value of the ounce Troy, and thus substituting a single weight for the three now in use.

7. *Resolved*, That the committee on coins, weights and measures, be and they are hereby authorized to take such steps, by correspondence or otherwise, as will in their judgment be most likely to give effect to the above resolutions.

[The above resolutions were unanimously adopted by the Convocation.]

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* In accordance with this resolution, Professor Davies has published a work entitled, The Metric System, considered with reference to its introduction into the United States; embracing the reports of the Hon. John Quincy Adams, and the lecture of Sir John Herschel. * * * A. S. Barnes & Company, New York and Chicago, 1870. 12o: pp. 327. Under authority of the legislature, a copy of this work has been placed in the library of each college and academy of this State.

THE METRIC SYSTEM.

Note.—In all the tables the unit is in small capitals, and should be constantly referred to.

The entire Metric System as now used is given, that the reader may not be at the trouble of searching elsewhere for references in reading the report of the Committee.

The primary base, in this system, for all denominations of weights and measures, is the one-ten-millionth part of the distance from the equator to the pole, measured on the earth's surface. It is called a Metre, and is equal to 39.37 inches, very nearly.

The change from the base, in all the denominations, is according to the decimal scale of tens: that is, the units increase ten times, at each step, in the ascending scale, and decrease ten times, at each step, in the descending scale.

Measures of Length.

Base, 1 *Metre*=39.37 *inches, nearly.*

TABLE.

Ascending Scale.					Descending Scale.		
1 Myriametre.	1 Kilometre.	1 Hectometre.	1 Decametre.	1 Metre. Unit.	1 Decimetre.	1 Centimetre.	1 Millimetre.

The names, in the ascending scale, are formed by prefixing to the base, Metre, the words, Deca (ten), Hecto (one hundred), Kilo (one thousand), Myria (ten thousand), from the Greek numerals; and in the descending scale by prefixing Deci (tenth), Centi (hundredth), Milli (thousandth), from the Latin numerals. Hence, the name of a unit indicates whether it is greater or less than the standard, and also how many times. The table is thus read:

10 millimetres make .... 1 centimetre.
10 centimetres make .... 1 decimetre.
10 decimetres make .... 1 Metre.
10 Metres make .... 1 decametre.
10 decametres make .... 1 hectometre.
10 hectometres make .... 1 kilometre.
10 kilometres make .... 1 myriametre.

Table of Equivalents.

Myriametre.	Kilometre.	Hectometre.	Decametre.	Metre.	Decimetre.	Centimetre.	Millimetre.
.	.	.	.	.	.	1=	10
.	.	.	.	.=	1=	10=	100
.	.	.	.	1=	10=	100=	1,000
.	.	.=	1=	10=	100=	1,000=	10,000
.	.	1=	10=	100=	1,000=	10,000=	100,000
.	1=	10=	100=	1,000=	10,000=	100,000=	1,000,000
1=	10=	100=	1,000=	10,000=	100,000=	1,000,000=	10,000,000

Table of Equivalents in English Measure.

1 Millimetre =0.0394 inches, nearly.
1 Centimetre =0.3937 "
1 Decimetre =3.9370 "
1 METRE =39.37 in.=3.280833 ft.
1 Decametre =32 ft. 9.7 in.
1 Hectometre =19 rd. 14 ft. 7 in.
1 Kilometre =4 fur. 38 rd. 13 ft. 3 in.
1 Myriametre =6 mi. 1 fur. 28 rd. 6 ft. 4 in.

Besides a clear apprehension of the length of the base, 1 metre, it is well to consider the length of the largest unit, the myriametre, equal to nearly 6 and one-fourth miles; and also the length of the smallest unit, the millimetre, about four-hundreths of an inch. Compare also each of the smaller measures, the decimetre and centimetre, with the inch.

When, in the metric system, the value of any single unit is fixed in the mind, the values of all the others may be readily apprehended, since they always arise from multiplying or dividing by 10.

Methods of Reading.

The number 25365.897 metres, is read, in English,

Twenty-five thousand three hundred and sixty-five metres, and 897 thousandths of a metre. But in the language of the metric system, it may be read,

Two myriametres, 5 kilometres, 3 hectometres, 6 decametres, 5 metres, 8 decimetres, 9 centimetres, and 7 millimetres. It may also be read, beginning with the lowest denomination, 7 millimetres, 9 centimetres, etc., etc.

In reading, remember that the unit of any place is *one-tenth* of the unit in the place next at the left, and ten times as great as the unit of the place next at the right. Hence, the change from one unit to another, and the methods of reduction and reading, are identical with those in the system of decimal currency.

1. Write, numerate and read, five hundred and ninety-six hectometres.

2. Write, numerate and read, eighty-nine thousand and forty-one centimetres.

Measures of Surfaces, or Square Measure.

Base, 1 Are = the square whose side is 10 metres.
= 119.6 square yards, nearly.
= 4 perches or square rods, nearly.

The unit of surface is a square whose side is 10 metres. It is called an Are, and is equal to 100 square metres.

1 Hectare.	1 Are. Unit.	1 Centiare.

The table is thus read:

100 centiares make .... 1 Are.
100 Ares make .... 1 hectare.

Table of Equivalents.

Hectare.		Are.		Centiare.
		1	=	100
1	=	100	=	10,000

Equivalents in acres, roods and perches.

1 Centiare = 1.195985 sq. yards, nearly.
1 Are = 3.95367 perches.
1 Hectare = 2a. 1r. 35.367p.

Measures of Volumes.

Base, 1 Litre = the cube on the decimetre.
= 61.023378 cubic inches.
= a little more than a wine quart.

The unit for the measure of volume is the cube whose edge is one-tenth of the metre, that is, a cube whose edge is 3.937 inches. This cube is called a LITRE, and is one-thousandth part of the cube constructed on the metre, as an edge.

Ascending Scale.				Descending Scale.		
1 Kilolitre, or Stere.	1 Hectolitre.	1 Decalitre.	1 LITRE. UNIT.	1 Decilitre.	1 Centilitre.	1 Millilitre.

The table is thus read:

10 millilitres make.......................... 1 centilitre.
10 centilitres make.......................... 1 decilitre.
10 decilitres make.......................... 1 LITRE.
10 LITRES make.......................... 1 decalitre.
10 decalitres make.......................... 1 hectolitre.
10 hectolitres make.......................... 1 kilolitre, or stere.

Table of Equivalents.

Kilolitre or Stere.	Hectolitre.	Decalitre.	LITRE.	Decilitre.	Centilitre.	Millilitre.
.	.	.	.	.	1=	10
.	.	.	.	1=	10=	100
.	.	.	1=	10=	100=	1,000
.	.	1=	10=	100=	1,000=	10,000
.	1=	10=	100=	1,000=	10,000=	100,000
1=	10=	100=	1,000=	10,000=	100,000=	1,000,000

NOTE.—The kilolitre, or stere, is the cube constructed on the metre, as an edge. Hence, the litre is one-thousandth part of the kilolitre.

Equivalents in Cubic Measure.

1 millilitre = .061023 cubic inches.
1 centilitre = .610234 cubic inches.
1 decilitre = 6.102338 cubic inches.
1 LITRE = 61.023378 cubic inches.
1 decalitre = 610.233779 cubic inches.
1 hectolitre = 6102.337795 cu. in. = 3.5314454 cu. ft.
1 kilolitre, or stere = 61023.377953 cu. in. = 35.314454 cu. ft.

NOTE.—Law of change in the units and methods of reading are the same as in Linear Measure.

DRY MEASURE.

Equivalents in the Winchester Bushel.

Since 1 bushel = 2150.4 cu. in.; 1 pk. = 537.6 cu. in.; 1 qt. = 67.2 cu. in.; 1 pt.=33.6 cu. in.; therefore,

1 millilitre =.001816 pints.
1 centilitre =.018160 pints.
1 decilitre =.181606 pints.
1 LITRE =.1816060 pints.
1 decalitre =1 pk. 1.8083000 qt.
1 hectolitre =2 bu. 3 pk. 2 qt. 1.6 pt.
1 kilolitre, or stere=28 bu. 1 pk. 4 qt.

NOTE.—The litre, or standard, is a little less than 1 quart, and the stere nearly 30 Winchester bushels.

LIQUID MEASURE.

Equivalents in the Wine Gallon.

Since 1 wine gallon contains 231 cubic inches, 1 quart will contain 37.75 cubic inches; 1 pint, 28.874 cubic inches; and 1 gill, 7.21875 cubic inches; we have,

1 millilitre =0.008453 gills.
1 centilitre =8.084534 gills.
1 decilitre =0.845320 gills.
1 LITRE =1 qt. 1.1335 pt.
1 decalitre =2 gal. 2 qt. 1.1335 pt.
1 hectolitre =26 gal. 1 qt. 1 pt. 1.34 gills.
1 kilolitre, or stere=1 tun, 12 gal. 1 pt. 1.44 gills.

WEIGHTS.

Base, 1 Gramme=weight of a cubic centimetre of rain-water.
=15.432 grains, Troy, nearly.
=.0352746 ounces, Avoirdupois, nearly.

The unit of weight is also equal to the one-millionth part of the weight of a cubic metre of pure rain-water, weighed in vacuum. It is also called a GRAMME, and is equal to 15.432 grains, Troy, which is equal to .0352746 ounces, Avoirdupois, very nearly.

Ascending Scale.							**Descending Scale.**		
1 Millier, tonneau.	1 Quintal.	1 Myriagramme.	1 Kilogramme.	1 Hectogramme.	1 Decagramme.	1 GRAMME. UNIT.	1 Decigramme.	1 Centigramme.	1 Milligramme.

The table is thus read:

10 milligrammes	make....................	1 centigramme.
10 centigrammes	make....................	1 decigramme.
10 decigrammes	make....................	1 GRAMME.
10 GRAMMES	make....................	1 decagramme.
10 decagrammes	make....................	1 hectogramme.
10 hectogrammes	make....................	1 kilogramme.
10 kilogrammes	make....................	1 myriagramme.
10 myriagrammes	make....................	1 quintal.
10 quintals	make....................	1 millier, or tonneau.

Table of Equivalents.

Millier, or tonneau.	Quintal.	Myriagramme.	Kilogramme.	Hectogramme.	Decagramme.	GRAMME.	Decigramme.	Centigramme.	Milligramme.
								1 =	10
							1 =	10 =	100
						1 =	10 =	100 =	1,000
					1 =	10 =	100 =	1,000 =	10,000
				1 =	10 =	100 =	1,000 =	10,000 =	100,000
			1 =	10 =	100 =	1,000 =	10,000 =	100,000 =	1,000,000
		1 =	10 =	100 =	1,000 =	10,000 =	100,000 =	1,000,000 =	10,000,000
	1 =	10 =	100 =	1,000 =	10,000 =	100,000 =	1,000,000 =	10,000,000 =	100,000,000
1 =	10 =	100 =	1,000 =	10,000 =	100,000 =	1,000,000 =	10,000,000 =	100,000,000 =	1,000,000,000

Equivalents in Avoirdupois and Troy Weights.

1 milligramme = 0.0154 grains, Troy.
1 centigramme = 0.1543 grains, "
1 decagramme = 1.5432 grains, "
1 GRAMME = 15.4327 grains, "
1 decagramme = 0.3527 ounces, Avoirdupois.
1 hectogramme = 3.5274 ounces, "
1 kilogramme = 2.2046 pounds, "
1 myriagramme = 22.046 pounds, "
1 quintal = 220.46 pounds, "
1 millier, or tonneau = 2204.6 pounds, "

NOTE.—Law of change in the units and methods of reading, the same as in Linear Measure.

NATURE OF THE METRIC SYSTEM.

The Metric System is based on the METRE. From the metre, three other units are derived; and the four constitute the primary units of the system. They are:

METRE =39.37 inches, nearly: unit of length.
ARE =a square on 10 metres: unit of surface.
LITRE =a cube whose edge is a decimetre: unit of volume.
GRAMME=the weight of a cube of rain-water, each edge of which is a centimetre: unit of weight.

From these four units all others are derived, according to the decimal scale.

Every system of weights and measures *must* have an *invariable unit* for its base; and every other unit of the entire system should be derived from it, according to a fixed law.

The French government, in order to obtain an invariable unit, measured a degree of the arc of a meridian on the earth's surface, and from this computed the length of the meridional arc from the equator to the pole. This length they divided into ten million equal parts, and then took one of these parts for the unit of length, and called it a METRE. The length of this metre is equal to 1 yard, 3 inches, and 37 hundreths of an inch, very nearly. Thus they obtained the length of the unit which is the base of the Metric System of Weights and Measures.

The next step was to fix the *law* by which the other units should be obtained from the base. The scale of tens was adopted.

PRONUNCIATION.

ME'TRE.	ARE.	LI'TRE.	GRAMME.
Mil'li-me-tre.		Mil'li-lī-tre.	Mil'li-gramme.
Cen'ti-me-tre.	Cen'tiāre.	Cen'ti-lī-tre.	Cen'ti-gramme.
Dec'i-me-tre.		Dec'i-lī-tre.	Dec'i-gramme.
Dec'a-me-tre.		Dec'a-lī-tre.	Dec'a-gramme.
Hec'to-me-tre.	Hec'tāre.	Hec'to-lī-tre.	Hec'to-gramme.
Kil'o-me-tre.		Kil'o-lī-tre.	Kil'o-gramme.
Myr'i-a-me-tre.		Myr'i-a-lī-tre.	Myr'i-a-gramme.

The following are the weights and measures established by law in France, and now in general use:

MEASURES AND WEIGHTS IN ACTUAL USE.

Measures of Length.

Double decametre.
Decametre.
Demi-decametre.
Double metre.
METRE.
Demi-metre.
Double decimetre.
Decimetre.

Measures of Volume, for Grain.

Hectolitre.
Demi-hectolitre.
Double decalitre.
Decalitre.
Demi-decalitre.
Double litre.
LITRE.
Demi-litre.
Double demi-litre.
Decilitre.
Demi-decilitre.

Measures of Volume, for Liquids.

Double litre.
LITRE.
Demi-litre.
Double decilitre.
Decilitre.
Demi-decilitre.
Double centilitre.
Centilitre.

Weights in Iron.

Fifty kilogrammes.
Twenty kilogrammes.
Ten kilogrammes.
Five kilogrammes.
Double kilogramme.
Kilogramme.
Demi-kilogramme.
Double hectogramme.
Hectogramme.
Demi-hectogramme.

Weights in Copper.

Twenty kilogrammes.
Ten kilogrammes.
Five kilogrammes.
Double kilogramme.
Kilogramme.
Demi-kilogramme.
Double hectogramme.
Hectogramme.
Demi-hectogramme.
Double decagramme.
Decagramme.
Demi-decagramme.
Double gramme.
GRAMME.
Demi-gramme.
Double-decigramme.
Decigramme.
Demi-decigramme.
Double centigramme.
Centigramme.
Demi-centigramme.
Double miligramme.
Miligramme.

It will be seen from the above tables, that the weights and measures in general use do not at all follow the decimal scale; for, in all weights, and in all measures of volume, each decimal measure *has its double and its half*, while the *tables* are constructed entirely on the decimal scale. This discrepancy between the tables and the numbers in use must give rise to much confusion, and is a striking departure from the decimal system.

The preliminary action which led to the presentation of the foregoing report on the Metric System, is given in the preface of Professor Davies' work (referred to in the foot-note on page 182), from which the following extract is taken:

At the meeting of the University Convocation of the State of New York, at Albany, in the summer of 1866, the Hon. John A. Kasson, Member of Congress and Chairman of the Committee of the House of Representatives, on a "Uniform System of Coinage, Weights and Measures," called the attention of the members to the action of Congress, and earnestly asked such attention to the subject as in their judgment might seem wise and proper.

A Committee, consisting of the Chancellor, J. V. L. Pruyn, Professor Charles Davies, and Regent Robert S. Hale, was appointed, and instructed to report "What measures, if any, the Convocation should adopt in regard to a Uniform System of Weights and Measures."

The duty of collecting the materials for the report of the Committee was assigned, by the Chairman, to the second member named, and it seemed to be the unanimous opinion of the Committee that a report would be made, favorable to the introduction of the system into general use. On examination, however, it did not appear to the Committee, and especially to the one who had been charged with making the examinations, that the Convocation should commit itself, hastily, to the great and radical changes which the introduction of the Metric System would occasion. At the meeting of the Convocation in 1869, the Committee made a partial report, and explained, very fully, the changes which an examination of the subject had produced on the minds of some of its members, whereupon the Committee was discharged and a new Committee appointed, composed of Professor Charles Davies, Regent, Robert S. Hale, and Professor James B. Thomson. Professor Thomson has not acted with the Committee, and is, of course, not responsible for its doings.

The Committee have given the subject a very full and careful examination. They have shared the enthusiasm which the hope of a common Currency, a common unit of Weight, and a common unit of Measure, for all nations, has awakened throughout the world. They honor the French nation for having taken the first step in so great an undertaking. But in their judgment, the adoption of the Metric System, without modifications, and the entire obliteration of every unit of weight and measure which now form the warp of our language and the base of our traffic and commerce, while it is yet uncertain how far it may be adopted by other nations, would be most unwise.

We must not forget that the introduction of the Metric System carries with it the necessity of abandoning our own Saxon, and introducing a language entirely foreign, and which the masses will be obliged to use.

The report of the International Committee of the Paris Universal Exposition, states: "It will be observed that the French orthography is retained throughout. This is done for uniformity, and to avoid the word *gram*. * * * * The orthography should be retained for the sake of uniformity also. The Metric System is destined to be generally international. The names and orthography of all its divisions should be equally so. For this reason, alone, we should refrain from Anglicizing the French names."

REMARKS ON THE LIFE AND CHARACTER OF THE LATE GIDEON HAWLEY, LL.D.*

By John V. L. Pruyn, LL. D.,
Chancellor of the University of the State of New York.

Mr. President.—I have been requested to speak to the Convocation on the life and character of our late highly venerated associate, Gideon Hawley. The brief period which has elapsed since his death has prevented me from gathering much of the material requisite for the purpose. I will, however, place before you what I can, and hope that the deficiencies may be filled up hereafter. This will be done by me with the warmest feelings of regard for the memory of one who, in the early days of my professional life, did much to encourage me, and for whom, as events moved onward, I acquired increased respect the more I knew of his worth and attainments.

Mr. Hawley was born in the town of Huntington, in the State of Connecticut, on the twenty-sixth of September, 1785. In the year 1794, his parents, Gideon Hawley and Sarah Curtiss, removed to Ballston, in the county of Saratoga, in this State, where they remained until 1798, when they once more changed their residence to the town of Charlton, in the same county, only a few miles distant from Ballston.

The father was a farmer in moderate circumstances, and the son, the subject of my remarks, remained at home working on the farm until 1804, when he was sent to the academy at Ballston to be fitted for college, under the direction of the Rev. Dr. Perry. He entered Union College in 1805, and graduated in 1809, after a highly creditable career of study. The venerable Rev. Dr. Van Vechten, of Schenectady, for many years past one of the trustees of Union College, was his class-mate and room-mate during his college course, and at the funeral of his departed friend spoke of him in warm terms of respect and affection. Mr. Hawley remained at Union College as a tutor for about one year, and during the same time pursued the study of the law with Henry Yates, a brother of the late Governor Yates, then in full practice at Schenectady. He was, however, destined for the ministry of the Presbyterian Church, and commenced his theological studies under the direction of his family pastor. The Calvinistic doctrines which mark the confession of faith and the catechisms of that Church soon presented themselves, and he freely consulted with his teacher as to his doubts and difficulties in regard to them. The explanations he received were not satisfactory, and with that high moral tone which marked his whole career, he determined not to profess a creed which he could not conscientiously stand by. He at once abandoned his theological studies and resolved to resume the law. For this purpose he entered the office of Bleecker and Sedgwick, of Albany, both distinguished members of the Bar of that day, and was admitted to the Supreme Court in 1812. He determined to seek his fortune in the western part of our State, then known as "the west," and had reached Auburn, I think, in his horseback journey, when he heard, most unexpectedly, that he had been appointed State Superintendent of Common Schools, an office then recently created by the Legislature. He at once returned to Albany, and accepted the appointment. The salary attached to the office was very small, only $400 per annum, and Mr. Hawley found it necessary also to enter upon the practice of his profession. He did so in partnership with Philip S. Parker, Esq., a lawyer highly esteemed in professional and social life, and who subsequently became Recorder of Albany.

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* As the session of the Convocation was held shortly after the death of Mr. Hawley, there had not been sufficient time to obtain the facts requisite for a satisfactory notice of his life and character. At the close of the remarks made by Chancellor Pruyn, which were extemporaneous, the Convocation, by vote, requested him to add, before publication, such facts and statements as he might deem proper. While somewhat more of detail has therefore been given, care has been taken in no way to depart from the tone and substance of what was originally said.]

Mr. Hawley at once gave to his official duties his best efforts and energies, and always looked to his services in this department as by far the most important of his business life. He believed that he could justly claim to have done more than any other person to organize and establish on broad and sound principles our common school system. In our personal intercourse he often spoke to me quite freely on this subject, and I promised him that if opportunity offered in the future, I would not fail to speak of his enlightened zeal and efficiency in this respect, which entitled him to rank as one of the great benefactors of our State. That this was so looked upon by others, I will quote a passage from a notice of his life which appeared shortly after his decease, in the columns of one of our most influential public journals; evidently from the pen of one thoroughly acquainted with the subject. The writer, after speaking of Mr. Hawley's acceptance of the office of Superintendent of Common Schools, adds: "He addressed himself with great earnestness to his work. A system was to be organized; interest in public schools was to be excited; laws were to be drafted and the Legislature to be influenced for their passage. He proved himself equal to the work. His sound judgment, incorruptible integrity, and zealous devotion to the cause entrusted to him, secured the confidence of the Legislature to such an extent that, on the consideration of an important law, he was called upon the floor of the Assembly to answer inquiries and explain its provisions. He was emphatically the Father of the Common School System of the State."

At an early day in our history (1793), the Regents of the University called the attention of the Legislature to the importance of providing proper means of elementary education for the children of the State. Some moderate grants of money were made at different times for the purpose, and in 1811, a commission of five persons was appointed to report a plan for organizing common schools. The commission reported in 1812. This led to the enactment of a statute in that year, under which Mr. Hawley, on the 14th of January, 1813, was, as I have already stated, appointed Superintendent of Common Schools, by the Council of Appointment. He made his first report to the Legislature in February, 1814. It contained suggestions for many important modifications of the statute of 1813, and led to the enactment by the Legislature, of the amended School Law of 1814, entitled "An act for the better establishment of common schools," the draft of which had been prepared by the Superintendent, as was stated by the Committee of the Assembly, in their report to that body. The system now had not only shape and form, but the detail of its successful working had been satisfactorily provided for.

In the annual report of 1819, made by Mr. Hawley, he recommended a revision and consolidation of the several laws then existing in regard to common schools, which was favorably received by the Legislature, and the revised school act of 1819 was the result of his report and labors. It established the school system, with such modifications as its working had shown to be desirable, on principles which have guided our legislation to this time. In pursuance of one of the provisions of the act, Mr. Hawley, in December, 1819, issued "instructions for the better government and organization of common schools," which were of the most thorough and comprehensive character. He recommended, in addition to the ordinary elementary studies, that geography, surveying and history should be taught in the common schools, and suggested also the study of our criminal code and of some branches of our civil jurisprudence applicable to the common concerns of life. To show the character of his religious views, which, I may add, were strongly developed in his college life, I will quote his remarks in this document in regard to a school book known as "The Beauties of the Bible," especially as to the importance of a knowledge of the New Testament by the young. On this point he said: "While Christianity is revered as an institution of divine origin and its sacred precepts regarded as the best and only sure guide to moral excellence, a knowledge of the New Testament will be studiously inculcated in the minds of youth and made a necessary part of their elementary education."

Mr. Hawley retained office till the twenty-second of February, 1821, when, by reason of political changes, he was superseded. This act is referred to by Mr. Hammond, in his Political History of the State of New York, and is warmly denounced. The Legislature, however, in April of that year, abolished the office and transferred its powers and duties to the Secretary of State, who then became, *ex officio*, superintendent of common schools.

The chief events in the official career of Mr. Hawley are detailed in Randall's very complete Digest of the Common School System of the State, the first edition of which was published in 1844. I had intended to make some comments on the extent and the results of his labors, but this has been done by Mr. Randall (who was for many years deputy superintendent of common schools) in such fitting and eloquent language that I prefer to quote his remarks:

"To no individual in the State are the friends of common school education more deeply indebted for the impetus given to the cause of elementary instruction in its infancy, than to Gideon Hawley. At a period when everything depended upon organization, upon supervision, upon practical acquaintance with the most minute details, and upon a patient, persevering, laborious process of exposition, Mr. Hawley united in himself all the requisites for the efficient discharge of the high functions devolved upon him by the Legislature. From a state of anarchy and confusion, and complete disorganization, within a period of less than eight years, arose a beautiful and stately fabric, based upon the most impregnable foundations, sustained by an enlightened public sentiment, fortified by the best and most enduring affections of the people, and cherished as the safeguard of the State—the true palladium of its greatness and prosperity. Within this brief period the number of school districts had more than doubled, and the proportion of children annually participating in the blessings of elementary instruction, increased from four-fifths to twenty-four twenty-fifths of the whole number residing in the State of a suitable age to attend the public schools. When we take into view the disadvantages under which every new and untried system must, of necessity, labor, before it can be commended to general adoption, and consider the immense variety of interests which were, to a greater or less extent, affected by the stringent provisions of the act of 1812, and its subsequent amendments, we cannot fail of being surprised at the magnitude of the results which developed themselves under the administration of Mr. Hawley. The foundations of a permanent and noble system of popular education were strongly and securely laid by him, and we are now witnessing the magnificent superstructure, which, in the progress of a quarter of a century, has been gradually upbuilt on these foundations." (Randall's Digest, Ed. of 1844, pp. 28, 29.)

But the labors of Mr. Hawley in the cause of education were not limited to the common schools. On the twenty-fifth day of March, 1814, he was appointed Secretary of the Regents of the University. The duties of this Board were constantly increasing with the advance in the population and wealth of the State, and Mr. Hawley entered upon his secretaryship with his usual zeal and devotion. The emoluments of the office were very small, confined, I think, to a moderate fee for preparing and issuing diplomas in medicine, and he may be said to have discharged its duties almost without compensation. The forms of the annual reports of the colleges and academies to be made to the Regents were prepared by him, with great thoroughness, and the annual reports of the Regents to the Legislature, were, in a great measure, also his work. He resigned this office in 1841, having held it for the long period of twenty-seven years, when he was succeeded by one of the most distinguished sons of our State, that well-known and accomplished scholar, T. Romeyn Beck.

In 1842, Mr. Hawley was appointed by the Legislature one of the Regents, and continued a member of the Board until his death. As I was associated with him in the Board from the year 1844, I can speak from personal knowledge of the interest, the intelligence and the earnestness with which he discharged his duties. Even when I saw him, as I often did, in his sick room, during his long and distressing illness, he never failed to inquire about the proceedings and the work of the Board, and to express his warm interest in all that it was doing. With the exception of the short time, only about nine months, which elapsed between his resignation as Secretary and his election as a Regent, he had, when he died, been officially connected with the University for more than fifty-six years. Indeed, he had long been a living epitome of its history, its progress, its labors, and I may add, I trust, its influence.

In 1818, Mr. Hawley was elected one of the Trustees of the Albany Academy, an institution which then had for many years occupied, and, I may safely say, has to this time occupied a very prominent and advanced position among the educational institutions of the State. He was also one of the trustees named in the charter of the Albany Female Academy, the first institution of its class in the State, which was incorporated by the Legislature on the sixteenth day of February, 1821. Among its trustees were Chancellor Kent, who was the first President of the Board; the Rev. Dr. Chester; John V. Henry, and other gentlemen of high professional and social position.

It is almost needless for me to say that he discharged the duties of these trusteeships with his accustomed fidelity, attending faithfully the meetings of the trustees and the public examinations, giving a most commendable example to all holding similar trusts.

On the organization of the State Normal School, in 1845, Mr. Hawley was appointed one of the executive committee for its care and management. His associates were the Rev. Dr. Alonzo Potter, then a professor in Union College (afterward Bishop of the Protestant Episcopal Church in Pennsylvania); the Rev. Dr. William H. Campbell, then principal of the Albany Academy, now and for many years past President of Rutgers College; and Francis Dwight, a warm and intelligent friend of education, who had taken great interest in the establishment of the school, and who died deeply regretted a few years after it was founded. The distinguished Samuel Young, then the superintendent of common schools, was, in virtue of his office, chairman of the committee. Never was any new movement in educational measures in our country looked after by an abler or more enlightened board of management. The great success of the school, now in vigorous operation under the care of a most energetic and able president, the Rev. Dr. Alden, which has led to the establishment of several others by the State, proves how wisely its foundations were laid and how successful its teachings have been. Mr. Hawley remained at his post the last of the original board, in the faithful and zealous discharge of his duties, until 1852, when he resigned.

Mr. Hawley was also, for fifteen years, one of the Regents of the Smithsonian Institution, at Washington. He was appointed to this office by Congress, on the organization of the Institution in 1846, as a citizen of New York, and was continued in the position until 1861, when he declined further service. Many of his associates in the board were gentlemen of high national reputation, among whom may be named Rufus Choate and Richard Rush. Mr. Hawley uniformly, I believe, attended the annual sessions of the Regents at Washington, and warmly supported the policy and recommendations of the able and accomplished Secretary of the Institution, Professor Henry, who was at an early day a student, and subsequently one of the Professors in the Albany Academy, during the period in which Mr. Hawley was one of its trustees.

This closes what I have to say in reference to Mr. Hawley's connection with our educational interests. That we owe him a large debt of gratitude for his long, his zealous and his enlightened labors, all will, I am sure, most cordially admit. Long may his services be remembered. Long may a grateful community honor his name and memory.

I now pass to other events in Mr. Hawley's life. He never was fond of the excitement which attends so largely upon the practice of the law; nor did he desire to take any prominent part in the struggles of severe litigations, and above all, in the management of jury trials. The more quiet walks of the profession best suited his temperament, and he soon found his way into them.

In November, 1812, he was appointed, without any request on his part, to the office of Master in Chancery. The Chancery Bar was at that time small in number, and the business of the court quite limited in extent. But few of the members of the Common Law Bar found any occasion to practice in Chancery, and did not therefore apply for admission to that court. The increase, however, in the population, in the wealth, and above all, in the commerce of the country, soon began to add largely to that class of cases with which only an equity court can deal, and the jurisdiction and functions of the Court of Chancery grew largely in importance. The ability, the learning and the high personal character of the distinguished individual then at the head of the court, Chancellor Kent, commanded the respect and confidence of the public, and the business of the court rapidly enlarged. Mr. Hawley, by his well-known professional acquirements and his conceded integrity, had secured the full confidence, not only of the Chancellor, but of the members of the Bar generally, and references of cases pending in Chancery for the purpose of effecting judicial sales of property, for taking accounts and the settlement of estates, came to him from all parts of the State. He was also appointed Injunction and Taxing Master, which added largely to his powers and duties. For several years, his Master's business was so considerable, that his income from it much exceeded that of most of his professional brethren who were in full practice. He retained this office until about the year 1830, when the condition of his health, I believe, led him to resign it, or to decline a re-appointment.

Mr. Hawley, in December, 1819, was appointed Secretary of what has long been known as the Old Albany Insurance Company, a corporation formed in 1811, in which many of the then prominent citizens of Albany were interested, and which still has a vigorous existence, enjoying the well-earned confidence of the public. In June, 1853, he resigned the office in consequence of ill health, and the directors adopted a resolution regretting his resignation, and bearing their unqualified testimony to the “ability, fidelity and integrity” with which his duties had been discharged. At the time Mr. Hawley accepted this appointment, but little practical knowledge existed with us in regard to the business of insurance, and the principles on which it should be conducted. He at once made the matter his study, acquainted himself with the rules which governed it, and managed the affairs of the Company with such prudence and sagacity that it attained a large measure of prosperity.

As an evidence of the interest which he felt in the material advancement of the country, it should not be forgotten that he was a director at an early day in the Mohawk and Hudson (subsequently called The Albany and Schenectady) Railroad Company, the first railroad company chartered in our State, and that he subsequently was for many years the financial officer of the Utica and Schenectady Railroad Company, one the most successful corporations in the history of the many railroad enterprises of our country. In both positions, he had the entire respect and confidence of his associates.

The regard of the community for Mr. Hawley's business abilities and integrity was so signal that various other offices and trusts were conferred upon him. I will speak of but a few more.

In the early part of 1833, he accepted the chief executorship under the will of William James of this city, then lately deceased, who left a very large estate, the management of which required the almost undivided attention of those entrusted with its care. Mr. Hawley relinquished substantially all other business, and gave his time and energies to the new duties thus devolved upon him. The provisions of this will, consequent upon the change in the law as to trusts and powers under the Revised Statutes of our State, which took effect in 1830, gave rise to a litigation which ranks among the *causes celebres* of our own judicial history. The will was finally held to be void in its substantial parts, and consequent upon the results of this decision, a series of trusts arose to most of which Mr. Hawley became a party, and the closing up of which virtually ended his business life. When he had reached the age of sixty, foreseeing that it would occupy several years to settle his various trusteeships before the proper judicial tribunal, he at once addressed himself to the work, and earnestly requested me whenever my professional services should be required, to aid him in accomplishing it. He wished to devote, as far as might be, the residue of his life to the thoughts, the studies and the contemplations which, in his judgment, were appropriate to its closing years, and he looked upon his entire severance from the business world, not with regret, but with the calmness and satisfaction which a well spent life alone can give. He knew that he had resources in himself which rendered him quite independent of those business excitements of which he had seen his full share, and well understood how little satisfaction they could yield.

For several years I did what I could, professionally, to aid him in obtaining judicial discharges from his various trusts, and recollect the satisfaction which he expressed when I handed him the order of the court discharging him from his last trusteeship, prepared by me, as I best could, with that fullness and amplification of legal phraseology which, like the lawyers of the old school, he so warmly prized. He was verging towards seventy years when this took place, and thenceforth, independently of the moderate amount of care which his personal affairs required, and the discharge of his duties as one of the Board of Regents, he had very little to do with the outside world. He gave himself up to his family, to reading, to study and to contemplation. His habits of life were of the simplest kind, and he never swerved from them. While cheerful and hospitable in his home, he had little fondness for social life outside of his family circle, and rarely was seen in company or at large assemblages. He was more fond of the exact sciences and of metaphysics than of the classics, and from the long continued observation of things about him, combined with habits of thought and reflection, he viewed with earnest interest the movements in political, social and commercial life, which were so actively going on for many years before his death. Often, very often, did I gather instruction from his clear and sagacious views in regard to the events of the times and the results which inevitably awaited them.

Except in reports and documents of a public character, Mr. Hawley never appeared before the world as an author. In 1853, an essay by him, on the "Definitions of Knowledge and Truth, and on the primary division of knowledge into its most general departments, with some suggestions on their secondary or sub-division," was printed, but not published. He never would permit it to come before the public, and it is believed that but few copies of the work are in existence. It is arranged with all the method and clearness which marked everything the author did, and, as its title indicates, deals with subjects of the most profound and important nature. But the proper limit to these remarks will not permit me to go into detail as to the views presented by Mr. Hawley, in this almost purely metaphysical work. It marks, by its ability and depth of thought, the almost perfect seclusion and retirement from the cares of life, which, as I have already stated, he had at an early day resolved upon. With his dislike of notoriety, Mr. Hawley rarely alluded to this work, even with his intimate friends.

A second edition of these essays was printed for the author in 1856, under the same limitation as the first. This edition extends to two hundred and twenty-nine large, closely-printed, octavo pages. Of this, as of the first, but few copies are known to be in existence.

Some ten years before Mr. Hawley's death, disease seized upon him, and he suffered, till called away, with an internal complaint which, for a large portion of the time, gave him the most excruciating pain. He bore all this with patience, with resignation, I may add, with dignity. He was not confined to the house till about a year before his death; but long before that occurred, he often said to me that he had prayed most fervently to his Maker, to be released, if it were His will, from the agony under which he lived. He waited and waited, as he said, to die. On the seventeenth day of the month which has just closed, surrounded by his friends, in the full possession of his faculties and with Christian confidence and resignation, he was at last released from his earthly struggles, and his spirit passed to Him who gave it. In the words of the Chrysostom of our language, he died "in the comfort of a reasonable, religious and holy hope, at peace with God, and in perfect charity with the world."

Mr. Hawley was married on the 19th of October, 1814, to Margaret Lansing, a member of one of the most respected of the Dutch (Holland) families of this city, a woman who combined great excellencies of character with marked simplicity of life and the most exemplary piety. They commenced house-keeping in their own comfortable and well-situated house on North Market street (now known as Broadway), in this city, on the 11th of July, 1816, and there, in love and peace, they resided continuously for more than half a century, with the warm regard of all who knew them, and there they died. Mrs. Hawley, after watching over her husband's sick bed for many years with unceasing devotion, most unexpectedly preceded him, by a brief two years, to the better life, sincerely regretted by all who knew her. It is an interesting fact that while they thus lived, for more than fifty years, under one roof, Mr. and Mrs. Hawley occupied, during all this time, the same pew in the Second Reformed Protestant Dutch Church, where they regularly attended Divine Service, and of which church Mrs. Hawley was a devout communicant. And while the early difficulties which Mr. Hawley met in his theological studies, to which I have alluded, attended him through life and prevented him from professing the creed and joining the communion of the church whose services he so faithfully attended, I venture to say, that among those who there listened to the teachings of the Great Master, no one more cordially respected and embraced them in their breadth and integrity, than did Mr. Hawley.

He was one of the much abused class generally called, by those who do not fully comprehend what the term means, conservatives. He believed in honor and truth, both in public and private life. He had no confidence in mere expedients. He did not believe in paper money, except as a representative merely, or in bubbles of any kind. Always thoughtful, always considerate, those who knew him, knew also where to find him on all questions of duty and integrity, whether they concerned private interests or the general welfare. While expediency might at times embarass matters of public policy, it never with him entered into the question of right and wrong. He knew but one standard, and that the highest. And all this was combined with the most tender feelings and the warmest sympathies for all about him. His calm and thoughtful appearance gave little indication of the workings of his mind; but rarely have I heard our language used with more boldness and energy than by him, when he denounced deceit, dishonesty or oppression, either in public or private life.

His charities were unobtrusive and constant. He was liberal throughout life, and aid was quietly extended by him to many persons struggling with adversity. He had not the wish so common to most persons to accumulate property after he retired from active life; on the contrary, for many years before his death, with a generous liberality, after providing for his simple personal wants, he distributed the residue of his income among his children. Of these, he left surviving a son, two daughters and a grand-son, the only child of a daughter who died some years since. With every opportunity to acquire property presented to him at almost every step of his business life, he uniformly, with great calmness and philosophy, tempered his desires, and left but a moderate fortune for his family. He never, except on one occasion, and that early in his business life and for a short period, incurred a debt. On this point he was resolved; he was ready to aid those who stood near him with his property, with what he had, but he would not go beyond this. No person ever obeyed more thoroughly the apostolic precept, "owe no man anything."

Such was the life and such the death of our departed friend. I have endeavored to relate to you some of the incidents of his history, some of the events of his long and useful career, some of the traits of his character, in the simple way which I am sure would best have pleased him. His life shows how much of useful work may be accomplished by an earnest, honest and well directed mind, steadily persevering in duty, and how influence and position may be achieved without yielding unduly to the excitements of the social, the financial or the political world. The lesson is instructive to all, but especially to the young, who can so largely profit by the example of one who for many years so faithfully labored to promote their interests and their welfare.

UNIVERSITY NECROLOGY.

In addition to the foregoing eulogies on the late Vice-Chancellor Verplanck, Mrs. Emma Willard and Gideon Hawley, notices of members of the Convocation whose decease occurred during 1869–70, have been furnished as follows:

REGENT SAMUEL LUCKEY, D. D.

The Committee of the Regents of the University to which was assigned the duty of preparing an obituary notice of the late Regent Luckey, beg leave to report:

So numerous and so sad have been the bereavements of the Board during the current year, that your committee have felt like a burial detachment upon the field of battle, while attempting the duties assigned them. Since our appointment in January last, two more of our venerated associates, and one of the comparatively junior members of our number, have passed away. It was the peculiar privilege of two of these, and the most aged of our body, to anticipate the award of history, and to share, while yet living, the universal homage of the generation which survives them.

The Rev. Samuel Luckey, D. D., the subject of this record, was born at Rensselaerville, Albany Co., N. Y., April 4th, 1791.

With a respectable academical education, we find him, at the age of twenty years, awaiting admission into the ministry of the Methodist Episcopal Church, as a member of the New York Conference.

The Conference adjourned and left upon their minutes the name of Samuel Luckey attached to the Ottawa Circuit, Lower Canada. Those were heroic days, when the word *itinerancy* had a meaning unknown to the ministry of that church at the present time.

But young Luckey feared not, nor thought of wavering in his life-work. Four hundred miles stretched their tedious length between the traveler on horseback and his pastoral charge; a poor and scattered people awaiting his ministry. Bishop Asbury, the acknowledged patriarch of American Methodist history, questioned young Luckey as to his spirit and purpose, and finding him fearless and hopeful, inquired if he had money for his expenses. Twelve shillings were reported.

The bishop, who appropriated his own fortune, with all other funds he could raise by private solicitation, to the aid of the active itinerant work, then advanced a frugal purse to the young missionary, and started him for his far-off field.

We mention these early incidents in the career of our lamented associate, as furnishing an indice to the more effective traits of his character, and which typed themselves on all his history.

His appointment to Troy, New York, by the authorities of his church, in 1817–18, marked an epoch in his history. His pastorate was eminently successful, and here, in the twenty-fourth year of his age, he first attempted authorship. His work on the "Trinity," published by the request of the ecclesiastical body of which he was a member, won for its author an honorable name.

Although not a collegian, he had been a diligent student in the classics, in church history, in dogmatic theology, in general literature, and he was also a stern observer of human nature.

From this date, he appears before the church and the world in a new and commanding light.

In 1832, he was called to the Principalship of the "Genesee Wesleyan Seminary," as its first President. To this position Dr. Luckey brought the prestige of a sound reputation, a popular talent, good administrative qualities, a generous fraternal heart, and respectable scholarship. His connection with the seminary was a success, and from this period in his public life, we date an interest increasing and indefatigable to its close, in the educational affairs of this State. In May, 1847, he was elected a "Regent of the University;" and of the entire catalogue of highly respectable and useful gentlemen who have sustained this honorable relation, we apprehend but few have been more active and useful. His annual visits to most of the institutions under our care, in Western New York, were marked by a method and thoroughness which left their impress for good.

He preferred to visit during term time, rather than at anniversaries or commencements, in order that all the details of the institution might be unveiled to his official eye.

But it is not our purpose to trace further the history of his life.

Fifty-nine years of that life were spent in the active Christian ministry, and for twenty-two years of that time, he has been a member of this body.

In every position, our venerable friend and lamented associate has been found faithful, discreet and active. Through all the prolonged years of that life, no taint of dishonor or indiscretion has been found upon him. His pure life has not only been above reproach, but above suspicion. He may have been misunderstood, and men may have differed from him on points of policy or expediency, but upon ethics and propriety, never.

We shall be indulged, gentlemen, when we say that we bring to this duty to-day the affectionate remembrance of the pupil as well as the heart of a friend.

The beauty of Regent Luckey's character lay in the simplicity and sincerity of his Christian convictions. In all his utterances he could say, "I believed, therefore have I spoken." A commendable catholicity of spirit, which pervaded his whole life and character, arose from the same conviction, touching the broad and comprehensive genius of the gospel.

How pleasing to contemplate a life so spent. John Baptist "fulfilled his course." Paul could say, in dying, "I have fought a good fight, I have finished my course, I have kept the faith." Not less beautiful was the dying testimony of our venerable associate. "God has given me the witness" said he, "that he accepts my life-work." Blessed assurance indeed; a work required, a work accomplished, a work accepted!

The sun went down and found him in the field. His last sermon, in Rochester, was from the text, "Let me die the death of the righteous." We next find him in New York, visiting his old friends, and where he preached three times on the Sabbath. We next find him in this chamber, and greet him, for the last time, at an annual Convocation. He never appeared more in character than upon that occasion. The vigor of his early manhood, enriched by the wisdom of age, seemed restored; while his social nature entered with a zest into the high enjoyments of the occasion.

But the reaction came. The exposures and fatigues incident to his travel shook a constitution enfeebled by age, and he returned home with his death sickness upon him. His malady was attended with extreme weakness. Exhausted nature could not rally. His words were few, and he could see but few friends; but to those who came to his bed-side, his uniform salutation was, "All is peace."

Here we close this brief story of his life. More might be said, but here let us pause:

> "Draw the curtain round and let us all to meditation."

His face in death still wore the lineaments of his character, and the smile upon the sealed lips seemed to speak back to us the apostolic benediction with which he dismissed the Convocation, at our last adjournment:

"The peace of God, which passeth all understanding, keep your hearts and minds in the knowledge and love of God, and of his Son, Jesus Christ our Lord; and the blessing of God Almighty, the Father, the Son, and the Holy Ghost, rest upon and abide with you all, evermore. Amen."

WILLIAM H. GOODWIN,
Committee.

REGENT ROBERT CAMPBELL.

The decease of the late Hon. Robert Campbell, Lieutenant-Governor of the State from 1859 to 1863 inclusive, and a member of the Board of Regents since 1846, having been announced in the Convocation, appropriate tributes of respect to his memory were pronounced by Rev. Drs. Goodwin and Wilson, and Rev. John Jones, Principal of Geneseo Academy. The substance of Dr. Wilson's remarks has been furnished as follows:

PROFESSOR WILSON'S REMARKS ON THE LATE REGENT CAMPBELL.

MR. CHANCELLOR.—I desire to add a few words to what has already been said in regard to the late Lieut.-Governor Campbell; and this the rather because my acquaintance with him commenced at a period in his life somewhat earlier than that to which any of the remarks made by those who have preceded me have referred. When I first came to Bath, in Steuben county, my first home in western New York, in October, 1844, I found Robert Campbell, Jr., then a young lawyer, with a good practice, rapidly rising in popularity and the public estimation, and an enthusiastic politician. Notwithstanding the suggestions that have been made, I believe he was born in this State and in Campbelltown, in Steuben county; a town, which, as I always understood, took its name from the family to which the late Regent Campbell belonged; and if he was not born in that town, his parents, who were of Scotch origin, must have moved there at a very early period of the Lieut.-Governor's life.

His advantages for education were far inferior to what are now afforded in that part of our State. But Robert Campbell seems to have been one of those who are born to know, and who come to know as by a sort of instinct, we hardly can tell how, always surprising us by the extent and accuracy of their knowledge when we compare it with the opportunities they have enjoyed. He was at that time, particularly noted for his purity, his simplicity and his generosity of character. He was preëminently "*amicus omnibus amico egentibus*," a friend to everybody in need of a friend; and a large number of persons in need of legal services, many of whom had more justice in their cause than means to enforce it, found in him ready, and if need required, gratuitous aid. No wonder he rose rapidly in his profession and in personal and political influence.

Of his public life and career I know but little, and need not say anything, as they have been already spoken of by those who knew him well in all those relations of his life.

Some three or four years ago, on a visit to this, my early home in New York State, I received from Governor Campbell, almost immediately on my arrival, a message expressing his regret at his inability to call on me, and the hope that, without that piece of attention on his part, I would not fail to call and see him. I called, and found him the same Robert Campbell that I had known a quarter of a century before; grown old indeed, and broken with disease, but in heart and aspirations the same; simple, generous, frank, earnest and noble. I left him with the hope rather than the expectation of seeing him again; but Providence ordered it otherwise, and now I stand here with others to pay my humble tribute of praise to his merits and his worth. If not one of our greatest men, he was one of our purest and best; and to be good is better far than to be great, if Providence has not so ordered it that we may be both combined.

EX-SUPERINTENDENT VICTOR M. RICE.

The following are the leading facts respecting the late Hon. Victor M. Rice, who was the first Superintendent of Public Instruction of the State of New York, and the incumbent of that office during nine years:

Mr. Rice was born at Mayville, Chautauqua county, April 5th, 1818. His father, Hon. William Rice, was one of the early settlers of that county, having emigrated from Washington county, in this State.

Having graduated at Alleghany College, Meadville, Pa., in 1841, and having studied law for a time in his native village, Mr. Rice was employed, in 1843, as a teacher in a private school at Buffalo, which afterward became known as the "Buffalo High School." From 1846 to 1848 he was engaged in editorial work, but resumed teaching in the latter year, and in 1852 was elected Superintendent of Schools for the city of Buffalo. In 1853, he was elected President of the New York State Teachers' Association, of which he had been for several years a prominent member.

The Legislature of 1854 having passed "an act creating the office of State Superintendent of Public Instruction," Mr. Rice was chosen, by joint ballot, to fill that office, for three years from the first Tuesday of April in that year. During his first official term, and largely as the result of his personal endeavors, the office of school commissioner (one for each assembly district) was created, and provision was made for the apportionment of school moneys by the boards of supervisors of the several counties. This system superseded that of town superintendents, which had not proved satisfactory, and has continued in force until the present time. The compilation of the various fragmentary statutes relating to public instruction, under the title of "Code of Public Instruction," was also effected during the same period.

Mr. Rice was a member of Assembly from Erie county in 1861, and was chairman of the committee on "colleges, academies and common schools."

In February, 1862, he was a second time elected Superintendent of Public Instruction, and was again re-elected to that office in April, 1865. During this double term, he secured the revision of the general school laws of the State, the more extensive organization and greater efficiency of teachers' institutes, the establishment of five new normal schools, and the abolition of rate bills, thereby rendering all the common schools of the State absolutely free. This last measure he had for several years urged with great earnestness, and its final accomplishment may be regarded as the crowning event of his long period of official service.

Being positive and progressive in his views of education, and skillful in the execution of his favorite plans, he was well adapted to organize the important department over which he presided, and he was also remarkably successful in securing the legislative indorsement of his cherished measures for the improvement of the educational system of the State.

A change in the political character of the legislature of 1868 resulted in the election of his competitor for the office of Superintendent. Mr. Rice was subsequently employed as a bank officer in New York city, until his decease, which occurred from a carbuncle, at Oneida, on the 17th of October, 1869.

MRS. EMMA WILLARD.

After the reading of Mrs. John H. Willard's memorial of Mrs. Emma Willard, as contained in the foregoing pages, Professor Charles Davies, LL.D., addressed the Convocation as follows:

I rise, Mr. Chairman, to say a few words, commemorative of the life and labors of Mrs. Emma Willard, who has died during the past year. She was a distinguished educator, known to the whole country, and her memory is embalmed in many hearts.

It is about fifty years since Mrs. Willard published her plan of female education, which soon attracted the notice of Governor Clinton, who recommended it to the favorable consideration of the Legislature. That plan placed the foundations of elementary education on their right basis; the languages, mathematics, metaphysics, and logic. But little has since been added, and the plan has been received and accepted as a model. Soon after, Mrs. Willard founded the Troy Female Seminary, where her system has been developed and perfected.

Mrs. Willard brought to her great work a mind as clear and comprehensive as the light of noon-day, and a spirit as soft and gentle as the shades of evening. Her enthusiasm, in the improvement and elevation of her sex, filled her soul and inspired her life. For this she lived, for this she labored; and the fruits of that life and of those labors are scattered broadcast through the whole country, and through two generations.

Her great and special gift was her power of influencing and controlling others. This was not done by little arts and petty devices; wisdom and justice were the foundations of her government, sympathy and love the secrets of her power. It is the attribute of genius to impress itself upon others; and if Mrs. Willard be judged by this standard, she certainly had few equals. Her pupils, everywhere, bear the impress of their great educator. Trained to exact and severe thought, they analyze with logical accuracy. Inspired with the sentiment that life has duties which must be done, they do not waste it in frivolities. Having been taught by precept and example that home is the sphere and throne of woman, they fill that home with the precious joys of intelligence, peace and love.

Within the past year, Mrs. Willard has gone to her rest, and taken her place in history among the great minds and noble hearts of the nation. The time and place of her death are alike suggestive.

In the fullness of age, she approached the termination of life with the calmness of Christian philosophy and the faith of a true believer. When the last hour came, the final struggle was marked by fortitude and resignation, and the twilight of one life was but the morning rays of another. The place of her death was the old seminary building of Troy. Here, half a century ago, she founded an institution which has been an honor to our age and country. Here she taught the true philosophy of living and dying, works done in faith, and faith made practical in works. Here she inspired thousands of her own sex, for the common benefit of us all, with an ardent love of knowledge, with a profound reverence for the great truths of religion, and with the aspiration of duty to be done; and here she impressed upon them the nobility of her own nature.

Her grave has been fitly chosen. It is in the Troy Cemetery, on a beautiful knoll, overlooking the valleys of the Hudson and the Mohawk. Below lies the city of Troy, marking in solemn contrast the habitations of the living and the dead. Here rest the earthly remains of a great, good and noble woman. The city of Troy, which she loved, and which has greatly honored her, is entitled to have her ashes; but the whole country has her fame, and posterity will gather in the many fruits of her labors. When the enthusiasts in the cause of female education shall visit her grave, they will not strew it with flowers that fade and perish, but with the garlands of affectionate memories, that will never die.

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ERRATA AND ADDENDA.

The following errors and omissions have been detected :

Page 103, fourth line, annex "L. H. D." to "William C. Bryant, LL.D."

Page 187, first line, for "Report of the Mystic System," read "Report of the Metric System."

Page 192, fifteenth line, omit comma after the word "Regent."

Page, 197, add to the paragraph ending "T. Romeyn Beck," the sentence : During Mr. Hawley's incumbency of the office of Secretary of the Regents, namely, in 1834, the honorary degree of Doctor of Laws was conferred upon him by Rutgers College.

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